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SINGLE-STAGE EVALUATION OF HIGHLY-LOADED
HIGH-MACH-NUMBER COMPRESSOR STAGES
III. DATA AND PERFORMANCE
TANDEM ROTOR

January 1971

by

G. D. Burger and M. J. Keenan

Pratt & Whitney Aircraft Division
United Aircraft Corporation

prepared for

National Aeronautics and Space Administration

NASA Lewis Research Center

Contract NAS3-10482

L. Reid, Program Manager

Fluid Systems Components Division

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FOREWORD

The work described herein was done under NASA Contract NAS3-10482 by Pratt & Whitney Aircraft Division of United Aircraft Corporation, East Hartford, Connecticut. Mr. L. Reid, NASA - Lewis Research Center, Fluid System Components Division, was Project Manager. The work was performed during the period 18 February 1970 through 16 April 1970.

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ABSTRACT

Data and Performance Report Single-Stage Evaluation of Highly-Loaded, High-Mach-Number Compressor Stages, Tandem Rotor

A single-stage compressor with a 0.5 hub/tip ratio tandem rotor was designed to produce a pressure ratio of 1.936 at an efficiency of 84.2 percent. Rotor-tip speed was 1600 fps and flow rate was 187.1 lbs/sec. The design pressure ratio was obtained at design speed, with an efficiency of 83.1 percent and a flow of 177.8 lbs/sec. With radial inlet distortion, peak stage efficiency at design speed was 77.8 percent at a pressure ratio of 1.821 and a flow of 174.0 lbs/sec. With circumferentially-distorted inlet flow, the peak stage efficiency was 74.4 percent at a flow of 165.7 lbs/sec and a pressure ratio of 1.766.

I. SUMMARY

A compressor stage with tandem rotor blades, a tip speed of 1600 ft/sec, and high blade loadings was tested with uniform inlet flow and with radially and circumferentially distorted inlet flows. The stator had multiple-circular-arc airfoil sections, and the maximum Mach number (0.89) occurred at the hub, where the diffusion factor was 0.6. The stage had no inlet guide vanes, and the stator-exit flow was axial.

Overall performance at design speed, with uniform inlet flow for near-design and near-stall data points is compared with design values in Table 1.

Overall stage performance characteristics at design speed for uniform inlet flow and for radially and circumferentially distorted inlet flow appear in Table 2.

TABLE 1
OVERALL PERFORMANCE COMPARED WITH DESIGN VALUES

| <u>Parameter</u> | <u>Design Value</u> | <u>Near-Design Data Point</u> | <u>Near-Stall Data Point</u> |
|-------------------------------|---------------------|-------------------------------|------------------------------|
| Corrected Weight Flow, lb/sec | 187.1 | 177.84 | 173.18 |
| Rotor Pressure Ratio | 2.000 | 1.998 | 2.028 |
| Rotor Efficiency, Percent | 88.7 | 87.85 | 85.74 |
| Stage Pressure Ratio | 1.936 | 1.931 | 1.947 |
| Stage Efficiency, Percent | 84.2 | 83.1 | 80.36 |

TABLE 2

EFFECT OF INLET DISTORTION ON PERFORMANCE CHARACTERISTICS

| <u>Parameter</u> | <u>Uniform Inlet Flow</u> | <u>Radially-Distorted Inlet Flow</u> | <u>Circumferentially Distorted Inlet Flow</u> |
|--|-------------------------------|---|---|
| Flow Range, lb/sec | | | |
| $\left(\frac{W\sqrt{\theta}}{\delta_{\max}} - \frac{W\sqrt{\theta}}{\delta_{\min}} \right)$ | 180.1-171.0 | 175.9 - 173.2 | 177.2 - 154.7 |
| Maximum Stage Pressure Ratio | 1.947 | 1.821 | 1.766 |
| Maximum Stage Efficiency, Percent | 83.1 | 77.8 | 74.4 |
| $\frac{P_{\max} - P_{\min}}{P_{\max}}$ | 0 | 0.137 (outer 0.4 of inlet annulus area) | 0.225 (90° arc) |

The inability to achieve design flow caused high incidence angles on the rotor. Rotor deviations and losses were slightly higher than design estimates.

Static-pressure patterns relative to the rotor tips showed a low-pressure area at the entrance to the passages between front and rear blades. Shocks were normal to the flow at 105 and 100 percent of design speed and were spilled at 90 percent speed.

Contour plots were prepared for pressure, temperature, and velocity at the stator-exit instrumentation plane. Contour plots showed that stator losses were concentrated in corners, where the stators intersected the endwalls, and that these loss areas grew with increased back-pressure.

Measured levels of continuous stress on the rotor were in good agreement with design calculations. A stator resonance at 90 percent speed produced a high vibratory stress, but it occurred over a narrow range of speed; and performance was run at 88 percent speed without encountering limiting stresses. Stalls were abrupt with uniform inlet flow and gradual with distorted inlet flows. Indications of rotating stall were seen at all stalls. A failure of the distortion-screen support terminated the testing. The failure was not caused by any mechanical deficiency in the compressor.

II. INTRODUCTION

The purpose of the program was to determine the feasibility of efficient operation of a highly-loaded, high-Mach-number compressor stage through the use of advanced blade design concepts. A single-stage compressor with highly-loaded multiple-circular-arc blades and a rotor tip speed of 1600 ft/sec demonstrated an efficiency of 84.5 percent at a pressure ratio of 1.946, as reported in Reference 1. The same program called for experimental evaluation of a tandem rotor, which was designed to minimize losses due to shock boundary-layer interactions. As discussed in Reference 2, the trailing edge of the front blade was located near or slightly downstream of the assumed shock-impingement point, designed so that a stream of high-energy flow between front and rear blades isolate the front boundary layer from the subsonic suction-surface of the rear blade.

This report presents test results for the tandem rotor configuration.

III. APPARATUS AND PROCEDURE

A. Test Compressor

The compressor tested (Figure 1) was a highly-loaded, high-Mach-number, single-stage, with tandem rotor blades. It was identical to the compressor of Reference 1 except that the multiple-circular-arc rotor was replaced with the tandem rotor. The tandem rotor was designed for a corrected weight flow per unit of inlet annulus area of 42 lbs/sec ft², which gives a design weight flow of 187.2 lbs/sec for the rotor tip diameter of 33.0 inches with a 0.5 hub/tip ratio. The stage design pressure ratio is 1.936 at the rotor tip speed of 1600 ft/sec. Rotor design pressure ratio is 2.0, constant along the span. The tandem rotor was designed with the objectives of

1. Minimizing shock losses by contouring the supersonic section of the suction surface to minimize supersonic acceleration, and
2. Minimizing the effects of shock boundary-layer interactions by initiating the diffusion process on a subsonic portion of the blade, where the boundary layer affected by the passage shock is separated from this surface by a stream of high-energy air (Figure 2).

Tandem rotor blades were inspected by means of contour layouts on cylindrical surfaces. Inspection results for sections B, D, E, G, and M (Figure 3) are shown in Figure 4. The dashed line in each blade cross section shows the average deviation from design of four experimental blades. Although the blade inspection contours could not define the shape of the passage between the blades, they did show the trailing edge of the forward blade and the leading edge of the rear blade. Multiple-circular-arc sections were used inboard of Section B (from the hub to a radius of 10.4 inches) because shock-induced separation was considered unlikely. At Section B, a slot separates front and rear tandem sections, blending into tangentially-offset front and rear sections at Section D. Above Section D, tandem blades were designed by shifting the rear portion of the blade tangentially in the direction of rotation. In this way, a smooth transition is obtained between multiple-circular-arc blade sections near the root, and the tandem blade sections at mid span and tip. The axial locations and metal angles of the leading and trailing edges are the same as for the multiple-circular-arc blade (Reference 1).

At Section B, the trailing edge of the forward section was placed downstream of the estimated shock impingement point to provide for possible boundary-layer reattachment. At the tip, where the shock is very strong and there is little chance of reattachment, the trailing edge of the front section was located immediately behind the estimated shock-impingement point. Trailing edges of the front sections are shown on a projected view of the blade (Figure 3).

Width of the slot between the two tandem blade sections was 10 times the calculated boundary-layer momentum thickness on the pressure and suction surfaces at the assumed normal shock location. The ratio of slot length to width was three or more, whenever possible, for directional guidance and flow-rate control. The radii of the rear-section leading edge and the front-section trailing edge were determined from results of a vibration-stress test on various tandem-shaped test specimens (Reference 2). Figures 5 and 6 show several views of the tandem rotor blades and blade disk assembly. Design details for the tandem rotor and the stator are given in Reference 2 and summarized in Table 3. Design velocity diagrams can be obtained from Table 5 in Appendix 3. The average running clearance at design speed was 0.050 inches.

TABLE 3
 ROTOR AND STATOR DESIGN PARAMETERS

Rotor – Stations 8 and 9

| <u>% Span</u> | <u>Dia - 1</u> | <u>Dia - 2</u> | <u>β^*_8</u> | <u>β^*_9</u> | <u>β^*_{8ss}</u> | <u>β^*_{sh}</u> | <u>Solidity</u> |
|---------------|----------------|----------------|-------------------------------|-------------------------------|-----------------------------------|----------------------------------|-----------------|
| 5 (hub) | 17.47 | 19.77 | 48.97 | 1.87 | 55.40 | 45.74 | 2.1140 |
| 10 | 18.47 | 20.41 | 49.59 | 9.63 | 56.02 | 46.76 | 2.068 |
| 15 | 19.47 | 21.05 | 50.44 | 16.51 | 56.59 | 47.76 | 2.025 |
| 30 | 22.31 | 22.96 | 53.77 | 29.73 | 57.87 | 50.53 | 1.838 |
| 50 | 25.79 | 25.52 | 56.40 | 42.30 | 59.30 | 54.68 | 1.577 |
| 70 | 28.95 | 28.08 | 59.08 | 50.53 | 61.07 | 59.17 | 1.8776 |
| 85 | 31.20 | 29.99 | 61.63 | 54.11 | 62.96 | 63.01 | 1.2539 |
| 90 | 31.88 | 30.63 | 62.53 | 55.10 | 53.65 | 64.18 | 1.2219 |
| 95(tip) | 32.50 | 31.27 | 63.21 | 55.84 | 64.14 | 64.96 | 1.1876 |

Stator - Stations 10 and 11

| <u>% Span</u> | <u>Dia-1</u> | <u>Dia-2</u> | <u>β^*_{10}</u> | <u>β^*_{11}</u> | <u>β^*_{10ss}</u> | <u>β^*_{sh}</u> | <u>Solidity</u> |
|---------------|--------------|--------------|----------------------------------|----------------------------------|------------------------------------|----------------------------------|-----------------|
| 5 (hub) | 20.41 | 21.49 | 43.23 | -12.41 | 46.15 | 38.47 | 2.010 |
| 10 | 21.01 | 21.96 | 42.27 | -11.44 | 45.21 | 36.62 | 1.959 |
| 15 | 21.59 | 22.43 | 41.42 | -10.89 | 44.36 | 34.94 | 1.911 |
| 30 | 23.31 | 23.90 | 39.44 | -11.22 | 42.44 | 31.18 | 1.781 |
| 50 | 25.60 | 25.89 | 37.60 | -12.04 | 40.72 | 28.01 | 1.632 |
| 70 | 27.82 | 27.90 | 36.45 | -13.48 | 39.68 | 26.38 | 1.508 |
| 85 | 29.41 | 29.38 | 36.12 | -15.91 | 39.44 | 26.82 | 1.430 |
| 90 | 29.91 | 29.86 | 36.15 | -17.40 | 39.48 | 27.36 | 1.407 |
| 95 (tip) | 30.38 | 30.29 | 36.33 | -19.69 | 39.69 | 28.40 | 1.387 |

NOTE: Symbol definitions appear in Appendix 2.

The test facility was the same as described in Reference 1.

B. Instrumentation and Calibration

Instrumentation is the same as described in Reference 1 except that provision was made to increase the number of radial locations at which stator-exit tangential traverses could be made. Additional traverses at 2.5, 3.75, 7.5, 92.5, 96.25 and 97.5 percents of span from hub supplemented the radial locations of 5, 10, 15, 30, 50, 70, 85, 90, and 95 percents of span in order to obtain better definitions of wall boundary layers and secondary flows. Tangential traverses were made with combination probes (Figure 7) which simultaneously measure total pressure (P), static pressure (p), total temperature (T), and absolute air angle (β). The axial and circumferential positions of the instrumentation are shown in Figures 8 and 9.

C. Test Procedure

1. Shakedown Test

Shakedown tests were conducted to establish the mechanical integrity of the compressor and to locate critical stress boundaries which could limit the operating range over which the tests could be conducted.

A stator resonance with blade-passing frequency was found at 90 percent of design speed. This resonance was avoided in subsequent testing by running at 88 percent speed. Continuous rotor stress due to centrifugal and untwist loads did not limit operating range. Because rotor vibratory stress at stall increased with speed, stall points were not run above design speed.

Rotating-stall surveys were made with uniform, radially distorted, and circumferentially distorted inlet flows. Rotating stall was detected by measuring pressure fluctuations with rapid-response transducers at 25, 50, and 85 percent of passage height from hub. Continuous recordings were made as the throttle was closed until the compressor stalled and as the throttle was opened to recover from stall. Several surge pulses were recorded during this stall-transient survey. A limiting vibratory stress on the rotor, which was encountered as the compressor was throttled at 88 percent design speed with circumferentially distorted inlet flow, prevented the recording of rotating stall data at this speed. The stall point was identified during performance testing, however, when the rapid-response transducers used in detecting rotating stall were removed and stress levels dropped below the allowable maximum.

2. Performance Test

Six performance points, ranging in flow from open-throttle to near-stall, were obtained at 50, 70, 88, 100, and 105 percent of design speed, and stall flows were measured at 50, 70, 88, and 100 percent speed. The periodic static pressure fluctuations over the rotor tip were recorded at three points at 70 percent speed, three points at 90 percent speed, six points at 100 percent speed, and three points at 105 percent speed, ranging in flow from choke to near-stall. These data were obtained

to show the static-pressure field relative to the rotor blade tip, indicating shock position and strength. Tangential traverses at the stator exit were run at 15 radial positions for near-stall points at 88 and 100 percent speeds and for the maximum-efficiency point at 88 percent speed.

3. Distorted-Inlet-Flow Performance Test

Inlet-flow distortions were generated with the same screens as used in the multiple-circular-arc rotor tests (Reference 1). Check points run with the distortion support screen showed that it did not affect uniform inlet performance. Performance data with both radial and circumferential inlet-flow distortion were taken at 70, 88, and 100 percent of design speed with the throttle at three positions (wide-open, part-throttle, and near-stall), except where high stress prevented taking near-stall data points. Each circumferential-distortion data point was taken with the screen in six different positions with respect to the compressor instrumentation.

D. Calculation Procedure

The calculation procedure was the same as described in Reference 1 with pertinent performance parameters defined in Appendices 1 & 2. In addition, stator-exit velocity vectors were calculated from tangential traverse measurements at 2.5, 3.75, 5.0, 7.5, 10, 15, 30, 50, 70, 85, 90, 92.5, 95, 96.5, and 97.5 percent of passage height from hub. Tangential spacing between probe measurements was set to give 15 readings across a stator gap at 97.5 percent of span from the hub. Measurements of total and static pressure were used, with a probe calibration, to determine Mach number. Total-temperature measurements were corrected for Mach-number and pressure-level effects. Velocities were determined from Mach numbers and total temperatures. Measured flow angles were corrected for Mach-number effect and used to resolve velocity into axial and tangential components.

IV. RESULTS AND DISCUSSION

Test results are organized into three categories:

- A. Shakedown test results, including stress and rotating stall data.
- B. Performance with uniform inlet flow, including overall performance of the stage and the tandem rotor, blade element data for the rotor and stator, static pressures over rotor blade tips, and contours of velocity, pressure, temperature and air angle at the stator exit instrumentation plane.
- C. Performance with distorted inlet flow. With radial distortion, results include overall performance of the stage and the rotor and blade-element data for the rotor and stator. With circumferential distortion, the results present overall stage performance and circumferential flow patterns at the inlet and exit of the stage.

A. Shakedown Test Results

A stator resonance with blade-passing frequency produced a vibratory stress on the stator root leading edge of 21,000 psi at 90 percent speed. The resonance occurred over a narrow speed range and was not seen when speed was reduced to 88 percent of design, and this speed was substituted for 90 percent in all subsequent tests.

Continuous stress on rotor blades due to centrifugal and untwist forces was in good agreement with design predictions. Maximum continuous stress at design speed was 62,400 psi, compared with the predicted 63,400 psi.

A high vibratory stress on the bridge between front and rear rotor blades at 60 percent span limited operation with circumferentially-distorted inlet flow during shakedown testing. At 88 percent of design speed, stress due to vibration at the natural frequency of the front portion of the blade increased rapidly as the rig was throttled, reaching the limiting stress before the compressor stalled. The stress limit was set at 10,000 psi, based on fatigue specimen tests (Reference 2), where the maximum stress for failure within 10^7 cycles was 15,000 psi. The limiting stress was encountered only when the rotating-stall instrumentation was installed. Stall was reached at this speed during performance testing when the transient instrumentation was removed.

Rapid-response pressure transducers were placed at the rotor exit at 25, 50, and 85 percent of span from hub and at the stator exit at 50 percent of span for stall surveys. The surveys showed that stalls were abrupt with uniform inlet flow at all speeds, but they were gradual and not clearly defined with distorted inlet flows. An oscillograph trace (Figure 10) was made of pressure fluctuations measured during stall with uniform inlet flow at design speed. Compressor stall began with rotating stall at the tip and at midspan at the rotor exit. This was followed by a pressure drop at hub, midspan, and tip. Stall recovery began at the hub with a sudden strong pressure rise followed by a gradual return to the pre-stall level. Recoveries at midspan and at the tip followed the same pattern.

Tests with distorted inlet flows gave significantly different stall patterns. The oscillograph trace of the stall at 88 percent speed with radially-distorted inlet flow (Figure 11) shows that the stall consisted of irregular recurrences of rotating stall without a surge-stall recovery cycle. Pressure fluctuations were strongest at midspan, strong at the hub, and weakest at the tip. Midspan pressure fluctuations at the stator exit were similar to those at the rotor exit, but had lower amplitude. Stalls with circumferential distortion produced pressure fluctuations similar to those with radial distortion.

B. Performance with Uniform Inlet Flow

1. Overall Performance

Overall performance of the stage and the rotor alone are presented in Figures 12 and 13. Tabulated results are in Appendix 3. The stall line was established by extrapolating the characteristic speed lines to measured stall airflows, shown as slashed symbols. Because of high rotor-tip stresses, stalled operation was avoided above 100 percent of design speed. A maximum stage efficiency of 83.1 percent was achieved at design speed, with a pressure ratio of 1.9307 and a corrected weight flow of 177.8. The design stage efficiency was 84.2 percent at a pressure ratio of 1.936 and a corrected weight flow of 187.1. The rotor efficiency for the same data point was 87.85 percent for a pressure ratio of 1.998, compared with the rotor design efficiency of 88.7 percent and pressure ratio of 2.00. The inability to achieve design flow was probably caused by choking of the rotor along the entire span, as indicated by rotor blade-element data, where most data points fall on the choke side of the loss-versus-incidence curve.

Maximum rotor efficiency of 88 percent occurs at 90 and 100 percent of design speed, decreasing to 86 percent at 50 and 70 percent of design speed and 85 percent at 105 percent of design speed. The difference between maximum stage efficiency and maximum rotor efficiency is approximately the same at all speeds. The maximum efficiency point recorded at 105 percent of design speed occurred at the highest pressure ratio test point.

2. Blade-Element Data

Blade-element performance for a data point at design speed and near-design pressure ratio agreed reasonably well with design values. Figure 14 shows the rotor and stage adiabatic efficiency versus percent span from the hub, as compared with design values. Total-pressure-loss coefficient, diffusion factor, incidence, and deviation are presented versus percent span from the hub for the rotor and stator in Figures 15 and 16. Blade-element performance parameters were calculated at stations corresponding to the actual leading and trailing edges of the blades (Stations 8 and 9 of Figure 8). Rotor and stator blade-element plots for the entire uniform-inlet performance test are presented in Figures 17 and 18; data are tabulated in Appendix 3.

Rotor incidence at design speed (Figure 15) was more positive than designed over the entire span because of the inability to attain design flow. Incidence at part speed was generally higher than at design speed because critical area ratios in the channels between the blades

were sized for the supersonic relative Mach numbers at design point and have insufficient flow capacity when the relative Mach numbers are closer to 1.0.

Loss coefficients at the rotor hub were unrealistically low, and in some cases were slightly negative, while stator loss coefficients at corresponding spanwise locations were greater than expected. Calculations of loss coefficients were based on a stator-inlet total pressure distribution which was obtained from the peak total pressure as measured at each spanwise location by the stator trailing-edge wake rake. As discussed in Reference 1, this peak total pressure may not be an accurate approximation of the average total pressure at the stator inlet due to rotor wake-flow migration to the stator pressure surface. An alternate method for obtaining the stator-inlet pressure distribution, using a free-stream efficiency obtained from stator trailing-edge pressure and temperature measurements across a gap (Reference 1), was used to reduce design-speed data. Blade-element plots (Figures 17 and 18) and spanwise distributions of blade-element performance (Figures 15 and 16) show the design-speed data reduced by both methods. The free-stream-efficiency method eliminates the problem of unrealistic efficiency and loss near the hub, without affecting the other spanwise locations, although rotor deviations and stator incidences changed significantly. Blade-element performance of the rotor and stator, using the free-stream-efficiency method is given in Appendix 3.

3. Contour Plots of Rotor-Blade-Tip Static Pressure

Static pressures over rotor blade tips were measured with ten high-frequency-response pressure transducers. Data were obtained over a range of compressor operating conditions at 70, 90, 100, and 105 percent of design speed with uniform inlet flow, but weak and erratic signals at 70 percent speed prevented the acquisition of any useful data. Oscillograph traces of static pressure versus time (Figure 19) show that, at the rotor leading edge, the static pressure rise caused by the shock occurs near the pressure surface and moves toward the suction surface, along the measurement locations downstream of the leading edge.

Contours of static pressure regions over the rotor-blade tip (Figures 20 through 22) show shock position as a series of points which represent the instantaneous static pressure rise as observed on the oscillograph. The figures also include a rotor performance characteristic and the axial distribution of wall static pressure over the blade tip. At 100 and 105 percent of design speed, the shock is normal to the flow at the channel entrance for a wide-open throttle setting, but it moves upstream as throttling occurs. At 90 percent of design speed, the shock is spilled upstream of the channel entrance and is forced farther upstream with throttling. At all speeds, an expansion on the suction surface near the leading edge is followed by a precompression field due to the blade shape. An expansion occurs on the pressure surface near the entrance of the passage between the front and rear blades.

These data are considered qualitative for two reasons, 1) the difficulties in obtaining highly accurate measurements of pressure fluctuations, and 2) the existence of a wall boundary layer between the blade tips and the pressure sensing devices. The data is useful, however, in indicating how the relative position of the shock changes with back-pressure.

4. Contour Plots of Stator Exit Traverse Data

Tangential traverses were made at the stator exit for three uniform-inlet-flow performance points: maximum-efficiency and near-stall points at 88 percent speed, and near-stall at the design speed. Measurements of P , p , T , and β were made at 2.5, 3.75, 5.0, 7.5, 10, 15, 30, 50, 70, 85, 90, 92.5, 95, 96.25, and 97.5 percentages of passage height. Tangential spacing gave 15 readings across a stator gap at 97.5 percent of span. These measurements were used to calculate velocity vectors, and contour plots were constructed showing the patterns of $\frac{P}{P_{inlet}}$,

$\frac{p}{P_{inlet}}$, $\frac{T}{T_{inlet}}$, β , and $V_m/\sqrt{\theta}$ at the stator exit instrumentation plane. These contours are shown in Figures 23 through 27.

a. Total Pressure Ratio

Areas of strong gap wise gradients (Figure 23) exist near both walls, and progress toward midspan as back-pressure is increased. The wake width at midspan increases only a small amount, indicating that this area of the blade is not a problem. Low-pressure is seen in areas downstream of corners where the stator suction surface intersects the walls. The high average level of total pressure at the hub is attributable to test losses for the rotor and stator being lower than the design estimates in this area. Gapwise total pressure variations

near the endwalls may be caused by two other phenomena besides stator losses; 1) rotor wake-flow migration to the stator pressure surface (Reference 3), and 2) rotor work changes due to locally high back-pressure ahead of the stator.

b. Total Temperature Ratio

Total temperature plots (Figure 24) show a pattern similar to total pressure plots in endwall regions indicating that rotor-wake separation or rotor back-pressure patterns cause gapwise variations in both parameters. Temperature on the pressure side of the stator is approximately 25°F higher than on the suction side, with the high temperatures and pressures occurring in the same region. Matching total pressure and temperature profiles led to the free steam efficiency method for calculating stator inlet average total pressure. Areas of high gradients progress from endwalls toward midspan as back pressure is increased. Gapwise variations at midspan are confined to the stator wake region, and are much lower than those near endwalls.

c. Air Angle

Steep gradients in air angles near the endwalls (Figure 25) indicate a vortex downstream of the intersection of the wall and the blade, while only small variations occur over the wake at midspan. Some of the air-angle variation indicated by the probe is probably an effect of steep total pressure gradients because the balancing side-hole pressures on a wedge probe tend to turn it in the direction of the higher total pressure.

d. Static Pressure Ratio

The gapwise gradients of static pressure were weak (Figure 26). Pressure increases with radius, probably as a result of streamline curvature as the upstream hub convergence blends into a constant-diameter hub wall. Increased throttling raises the level of static pressure but does not cause large gradients.

e. Meridional Velocity

Meridional velocity contours (Figure 27) follow the patterns of the total pressure contours. Static pressure variations are small, and air angle does not vary enough from the axial direction to have a significant effect. Hub-region velocities show that the hub wall boundary layer is small except in the area affected by corner stall. Near the outer wall, increasing back-pressure enlarges the corner-stall region but does not appear to thicken the wall boundary layer.

C. Performance with Distorted Inlet Flow

1. Distortion-Support-Screen Effects

Performance points were taken at 100 percent of design speed with open throttle, part throttle, and near stall with the distortion-screen support but without distortion screens. Performance was not affected by the support screen, and the uniform-inlet flow performance provides a valid basis for determining the effects of inlet-flow distortion.

2. Radially-Distorted Inlet Flow

A radial-distortion pattern which covered the outer two-fifths of the rotor inlet area provided a distortion parameter of 0.137, with the discharge throttle wide open at 100 percent of design speed. Figure 28 shows the total pressure and meridional velocity at the rotor inlet versus percent of span, with radially-distorted inlet flow, for wide-open and near-stall throttle conditions at 100 percent of design speed.

a. Overall Performance

Overall rotor and stage performance with radially-distorted inlet flow is presented in Figures 29 and 30. The maximum stage efficiency at design speed was 77.8 percent and occurred at a pressure ratio of 1.82 and a corrected weight flow of 174.0 lbs/sec. These results represent reductions of 4.0 percent in maximum efficiency, 7.0 percent in maximum pressure ratio, and 5.0 lbs/sec in maximum corrected weight flow compared to the performance with uniform inlet flow at design speed. The stall line with radially-distorted inlet flow was significantly lower than with uniform inlet flow.

b. Blade-Element Data

Rotor and stator blade-element data is shown in Figures 31 and 32, compared with data from uniform inlet flow at 10, 50, and 90 percent span from the hub. Rotor-tip distortion resulted in a flow shift, with smaller axial velocities at the tip causing increased incidences, and larger axial velocities at the hub decreasing the incidences in the undistorted area. Levels of loss, diffusion factor, and deviation at the rotor-blade tip were essentially unchanged by the distortion for all speeds, but losses at the midspan and the hub increased. Stator incidences were affected by the flow shift in the same manner. All stator-blade-element parameters were basically unchanged except for increased stator tip losses. Tabulations of the blade-element and overall performance data for radially-distorted inlet flow are given in Appendix 4.

3. Circumferentially-Distorted Inlet Flow

A circumferential-distortion pattern using a 120-degree full-span screen at the rotor inlet provided a distortion parameter of 0.225 covering a 90-degree arc.

a. Overall Performance

Overall performance with circumferential inlet distortion is compared with uniform-inlet-flow performance in Figure 33. The maximum stage efficiency at design speed was 74.4 percent at a corrected weight flow of 165.7 lbs/sec and a pressure ratio of 1.766. Flow range with circumferential distortion was higher than with radial distortion. This greater flow range resulted in a stall line which was essentially the same as that with uniform inlet flow, although the stall pressure ratios were lower than with radial distortion and much lower than with uniform inlet flow.

Tabulations of circumferential distributions of stage inlet and exit velocities, Mach numbers, flow angles, and pressure ratios, and overall stage performance data is in Appendix 5. Rig failure limited testing to three points at design speed and two points at 88 percent speed. Major damage to the tandem blade (Figure 34) resulted from failure of a rig part. A section of the inner wall between two distortion screen support struts failed (Figure 35) and was ingested by the rotor.

b. Circumferential Flow Patterns

The relationship between inlet plenum and average rotor inlet-total pressure was correlated as a function of corrected flow (Figure 36) for reference, since all circumferential distributions of static and total pressure tabulated in Appendix 5 have been divided by the inlet plenum pressure. Rotor inlet circumferential distributions are shown in Figure 37, 38, and 39 for total pressure, absolute and relative flow angle, absolute velocity, meridional velocity, and absolute Mach Number at 10, 50, and 90 percent span from the hub. The plots were constructed by using measurements from radially-traversed disk probes at twelve circumferential locations in the rotor inlet relative to the distortion screen. Stator discharge circumferential patterns, measured by disk probes at stator mid-gap, are shown in Figures 40, 41, and 42. Circumferential distributions of static pressure at the rotor inlet, on both the inner case and the outer case, are presented in Figures 43 and 44.

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1. Sulam, D. H., Keenan, M.J., and Flynn, J. T., *Single-Stage Evaluation of Highly-Loaded, High-Mach-Number Compressor Stages, Data and Performance Report, Multiple-Circular-Arc Rotor*, NASA CR-72694, PWA-3772, 1970.
2. Monsarrat, N. Keenan, M. J., and Tramm, P. C., *Design Report, Single-Stage Evaluation of Highly-Loaded, High-Mach-Number Compressor Stages*, NASA CR-77562, PWA-3546, 1969.
3. Kerrebrock, J. L. and Mikolajczak, A.A., *Intra-Stator Transport of Rotor Wakes and Its Effect on Compressor Performance*, American Society of Mechanical Engineers, Paper No. 70-GT-39, 1970.

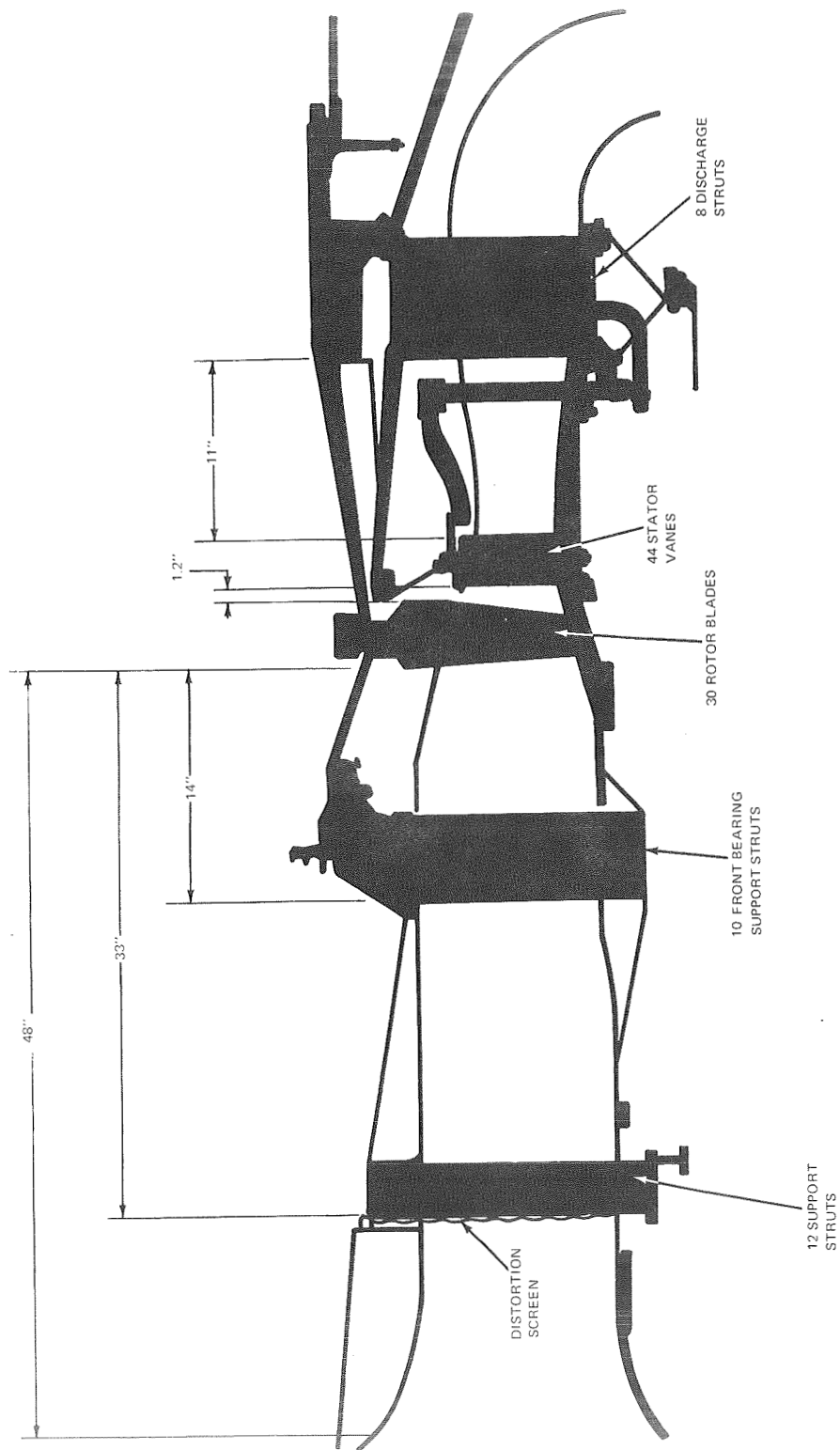


Figure 1 Cross Section of Test Compressor

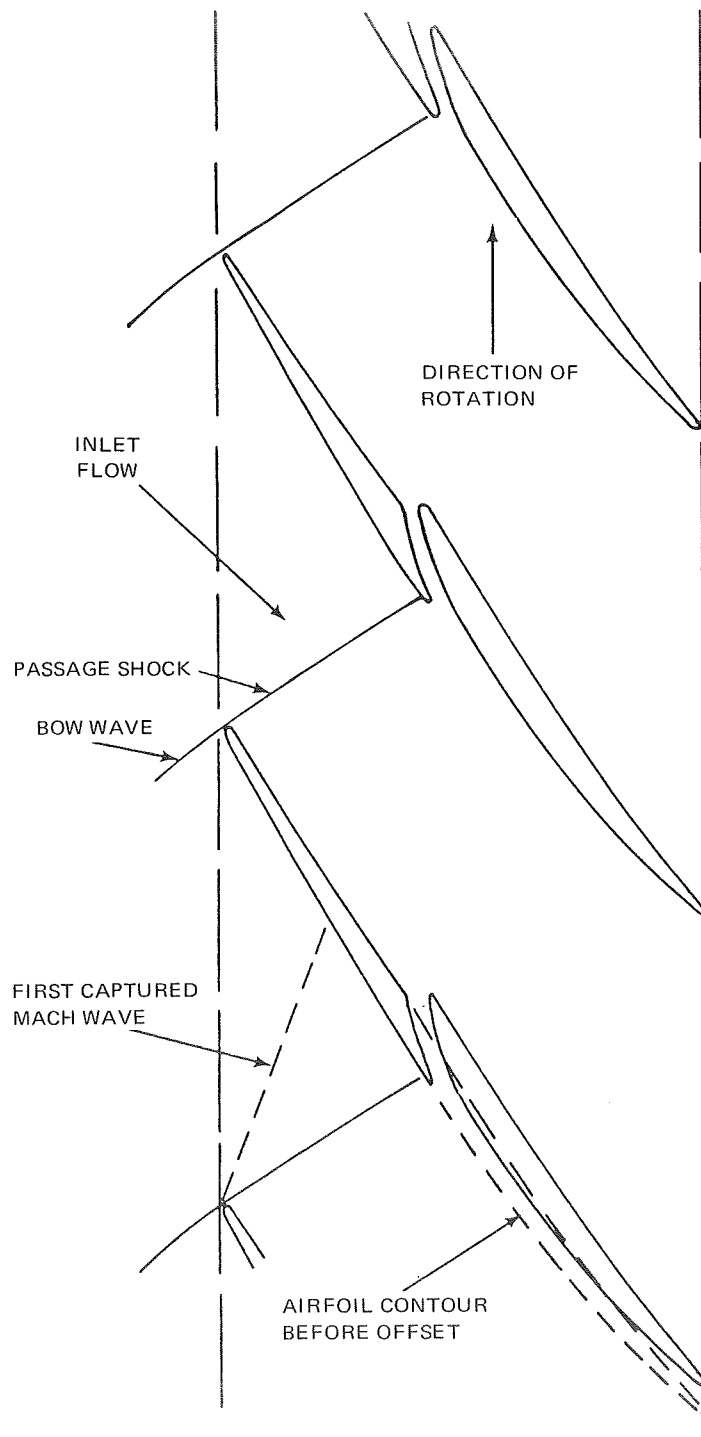


Figure 2 Tandem Rotor Blade Section

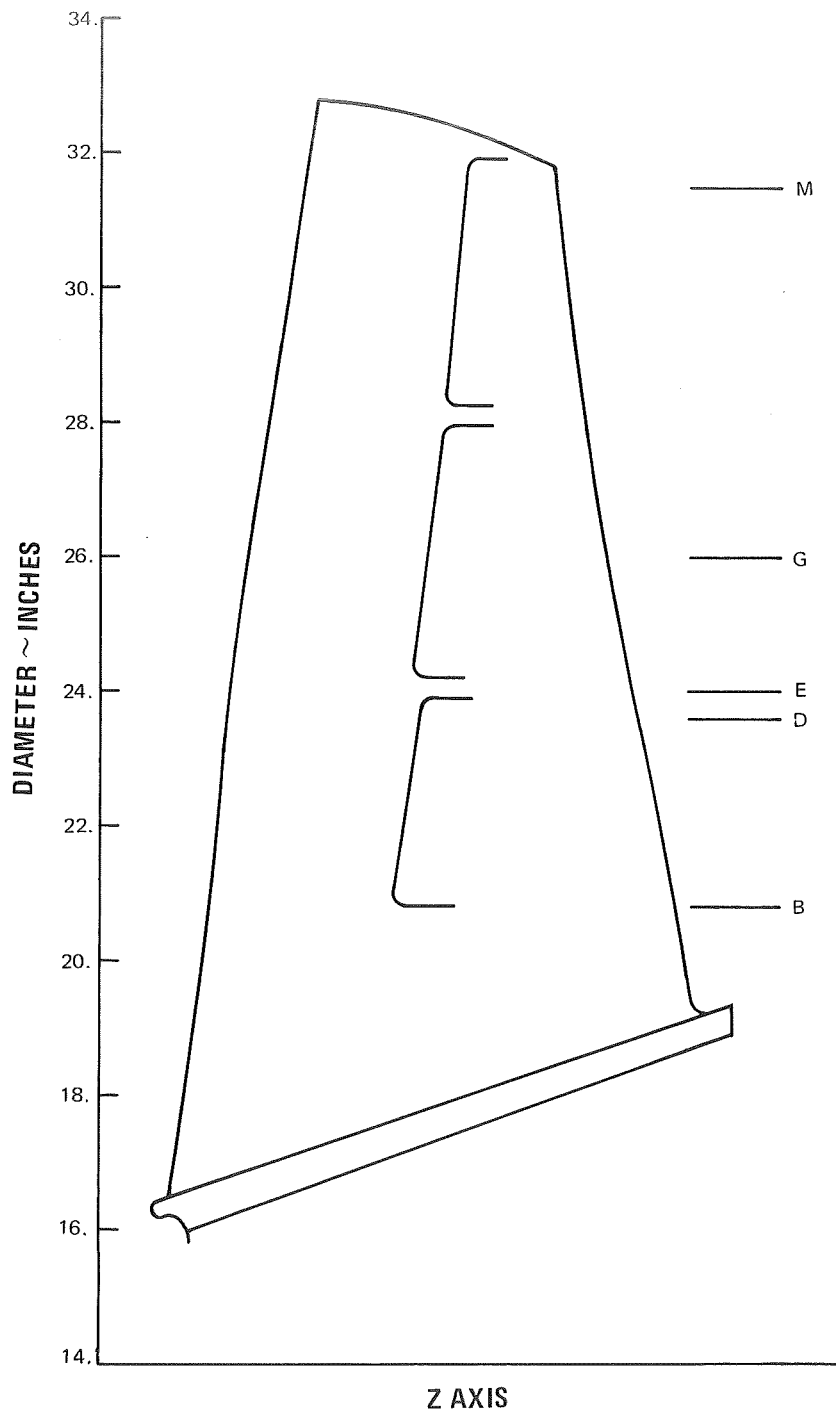


Figure 3 Axial Projection of Tandem Rotor Blade

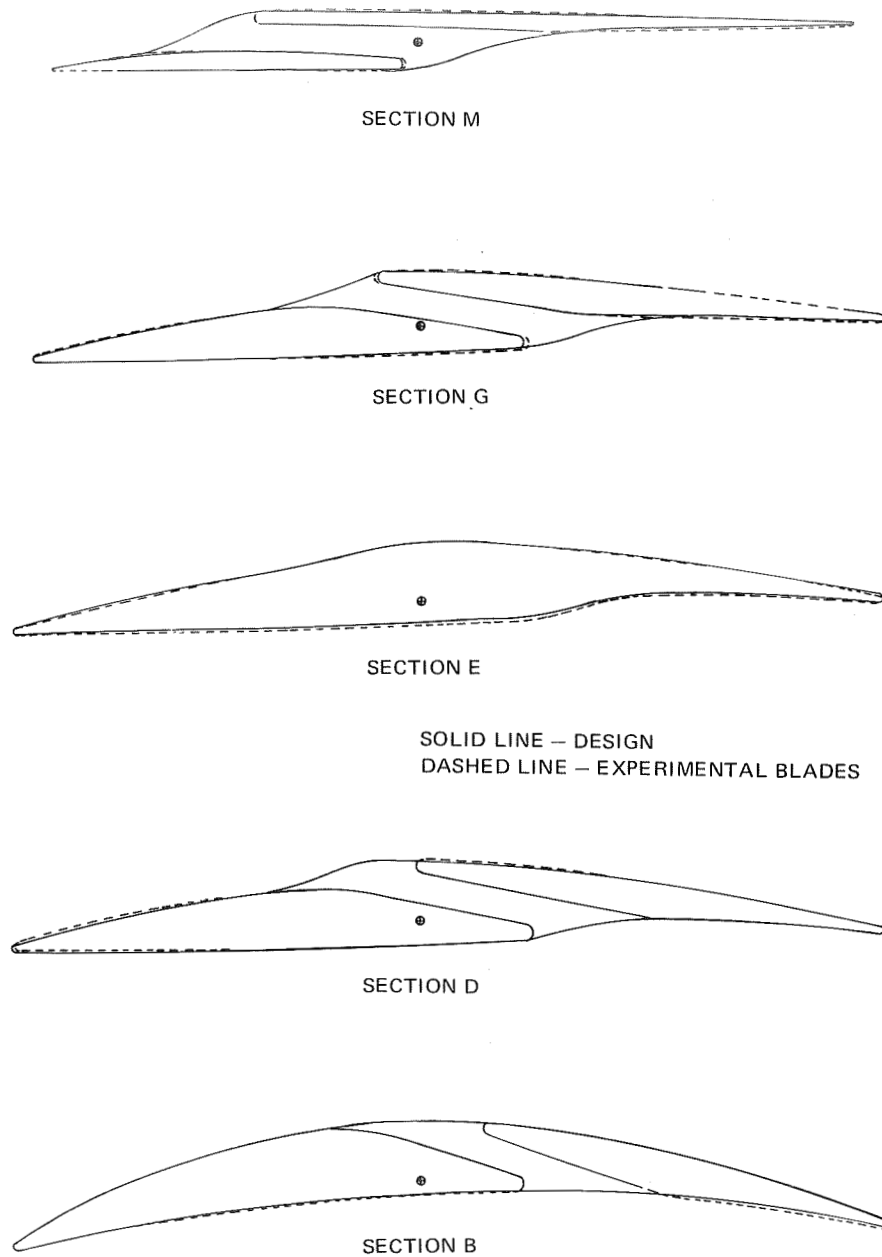
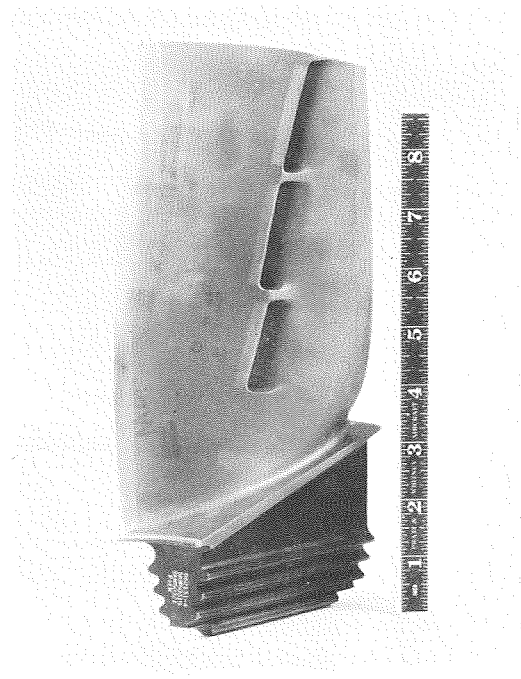


Figure 4 Tandem Blade Cross Sections



XPN-8744

PRESSURE SURFACE



XPN-8745

SUCTION SURFACE

Figure 5 Tandem Rotor Blade

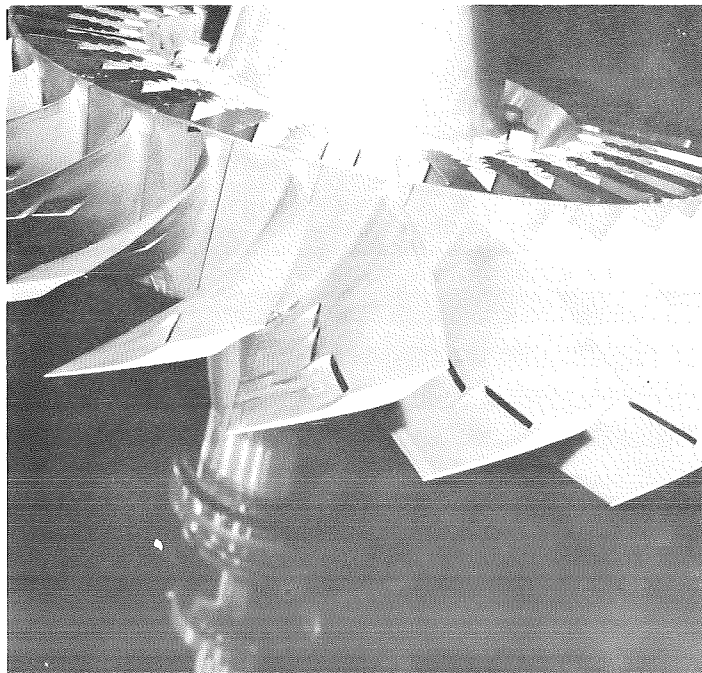
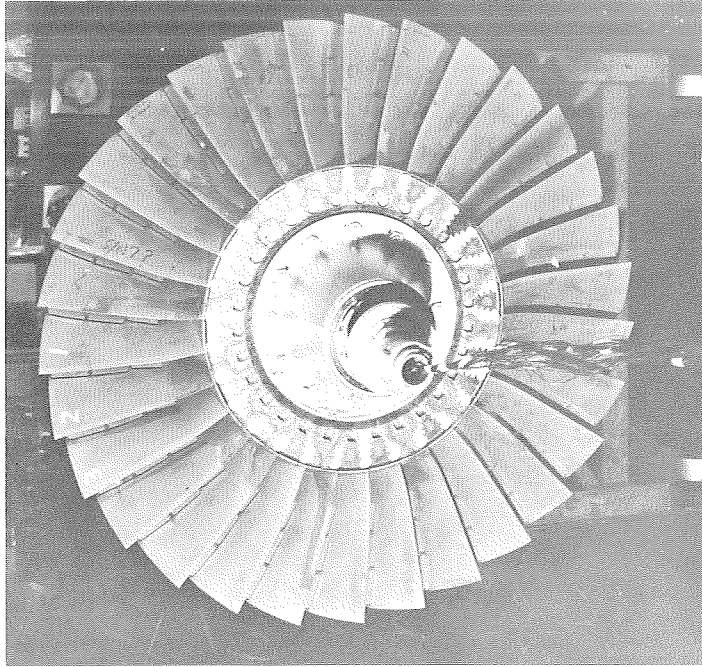
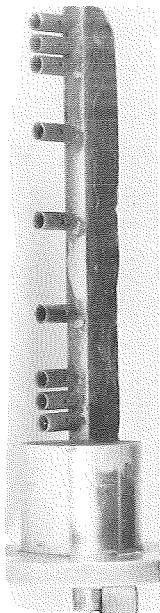


Figure 6 Assembled Tandem Rotor



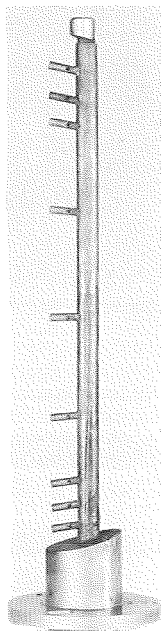
XP-99889

RADIAL TEMPERATURE RAKE



XPN-1815

TRAVERSABLE TOTAL PRESSURE RAKE



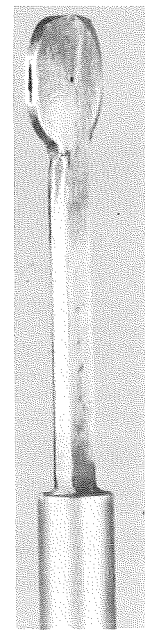
XP-99886

TOTAL PRESSURE RAKE



XPN-660

COMBINATION PROBE



XP-99893

TRAVERSABLE DISK PROBE

Figure 7 Typical Instrumentation

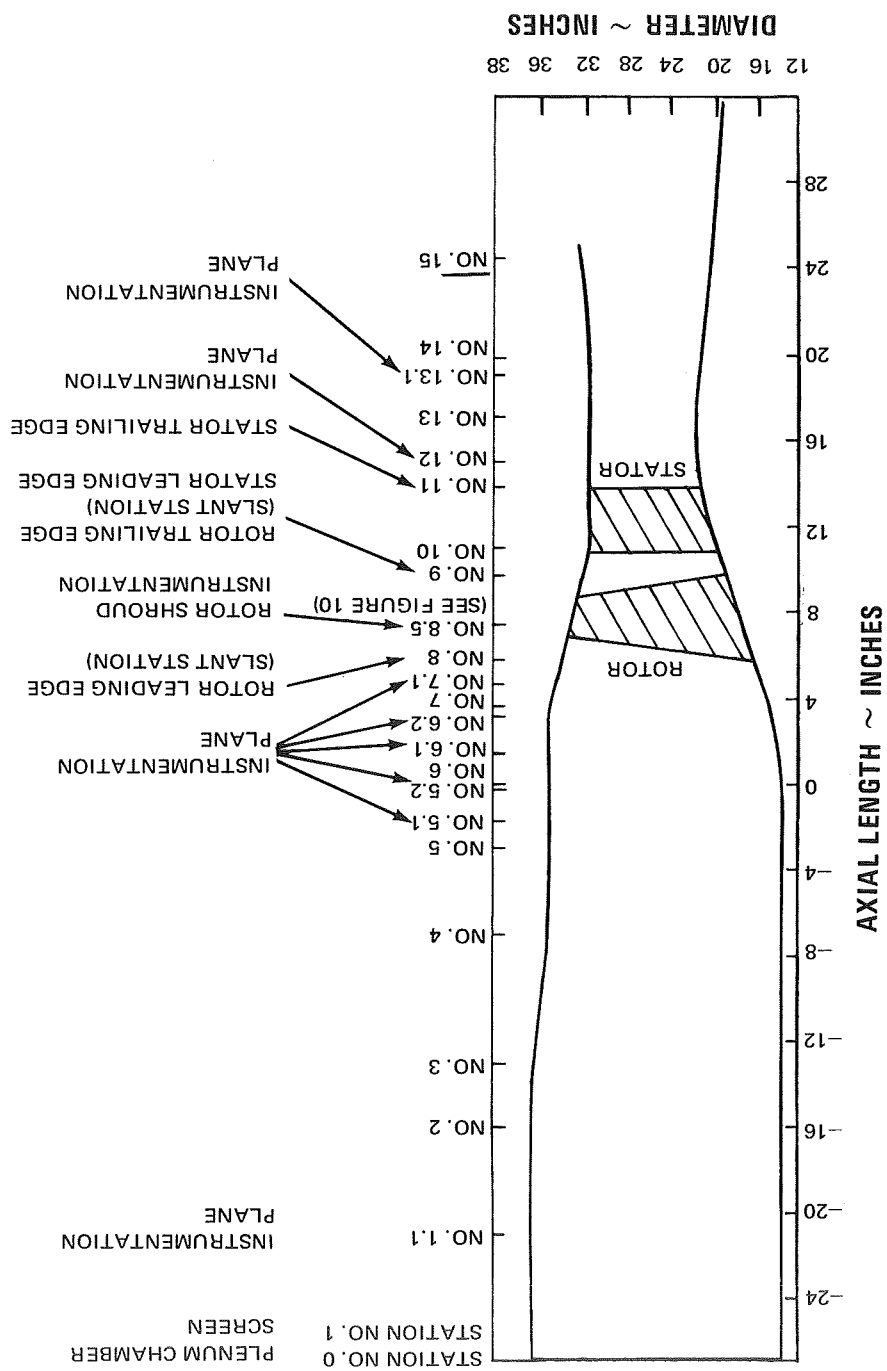


Figure 8 Axial Station Number Designation and Location of Instrumentation

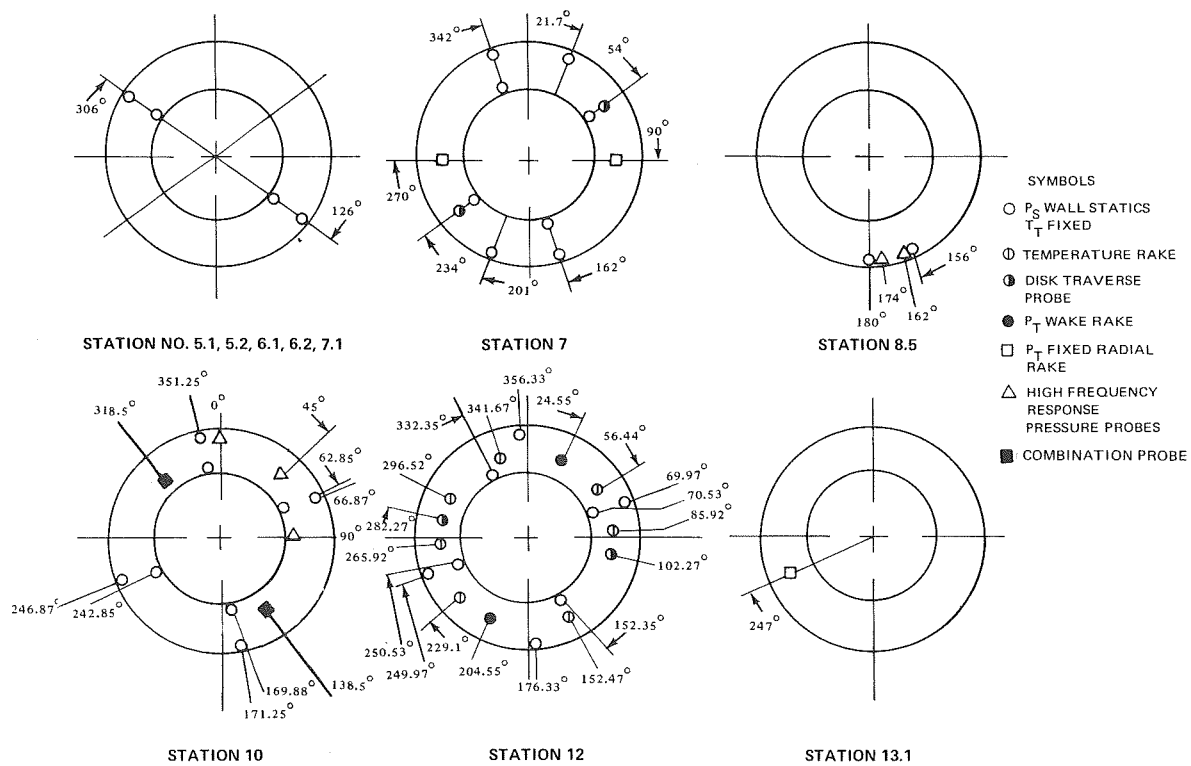


Figure 9 Circumferential Location of Instrumentation, Viewed From Rear

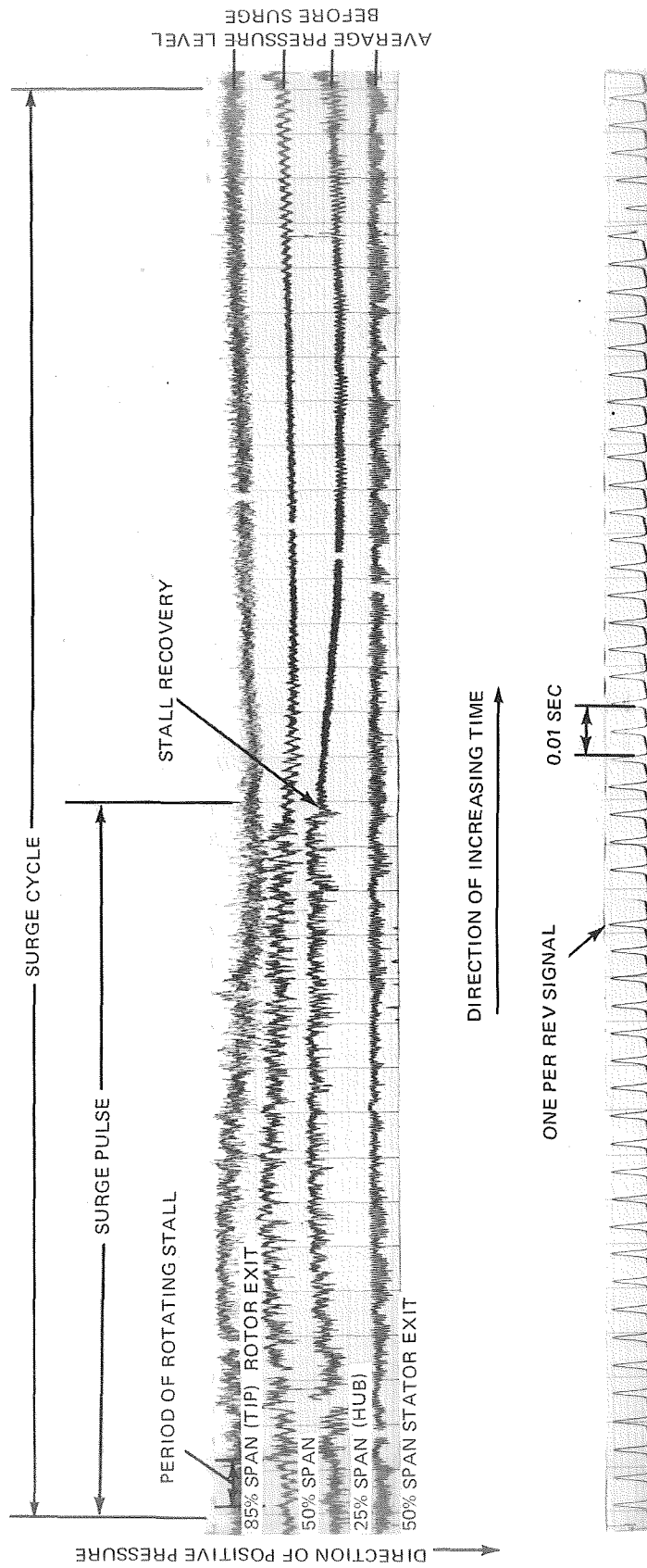


Figure 10 Oscillograph Trace of Typical Surge Cycle, Uniform Inlet Flow

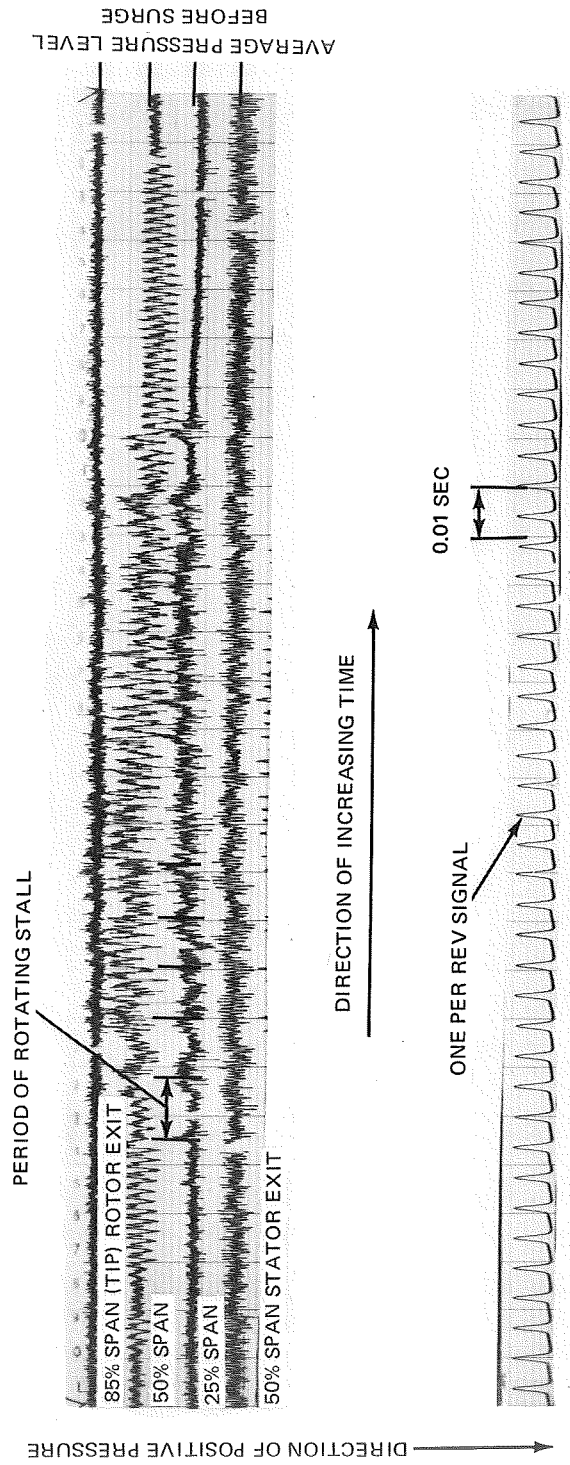


Figure 11 Oscillograph Trace of Typical Surge Cycle, Distorted Inlet Flow

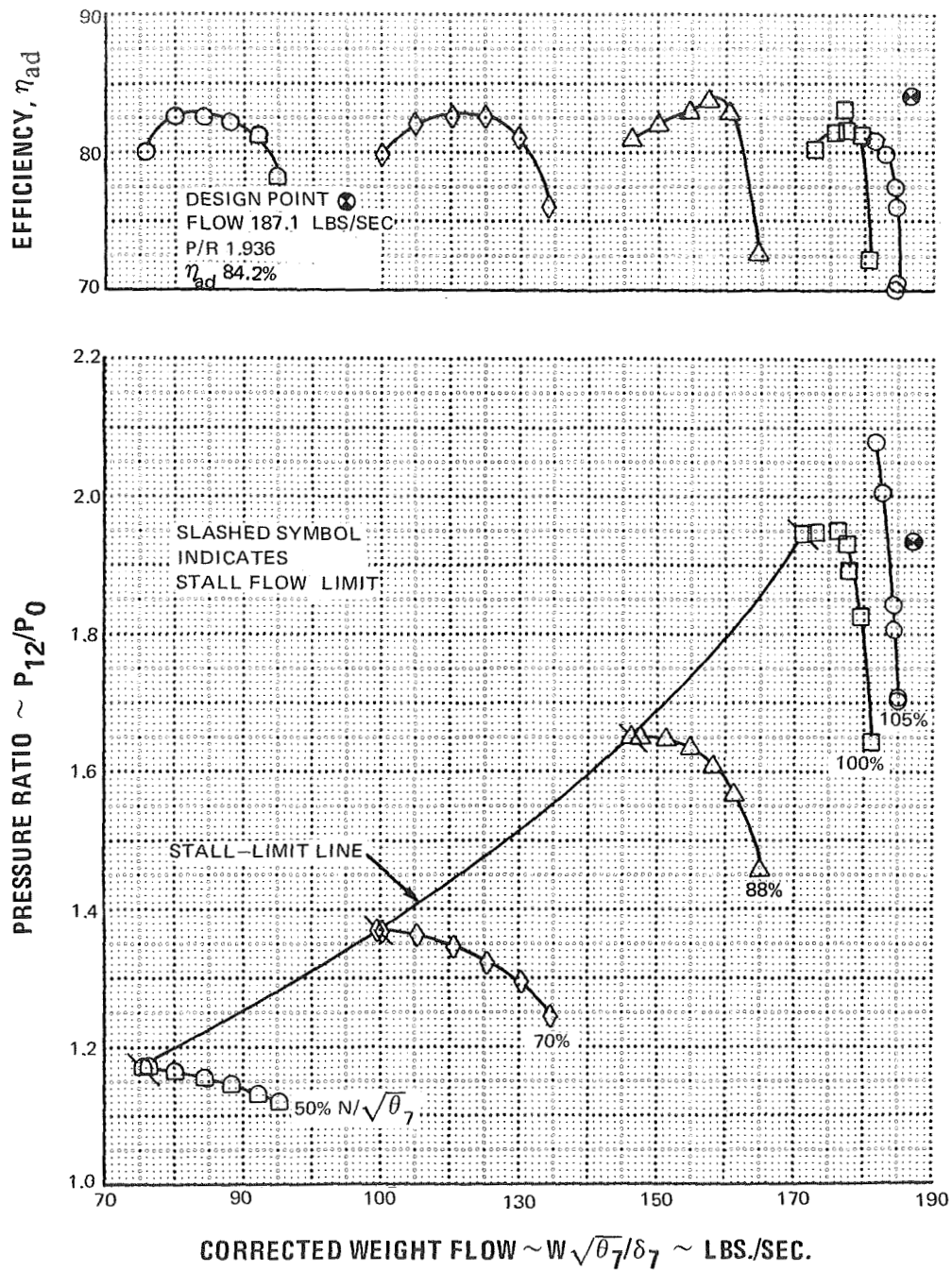


Figure 12 Stage Overall Performance With Uniform Inlet Flow

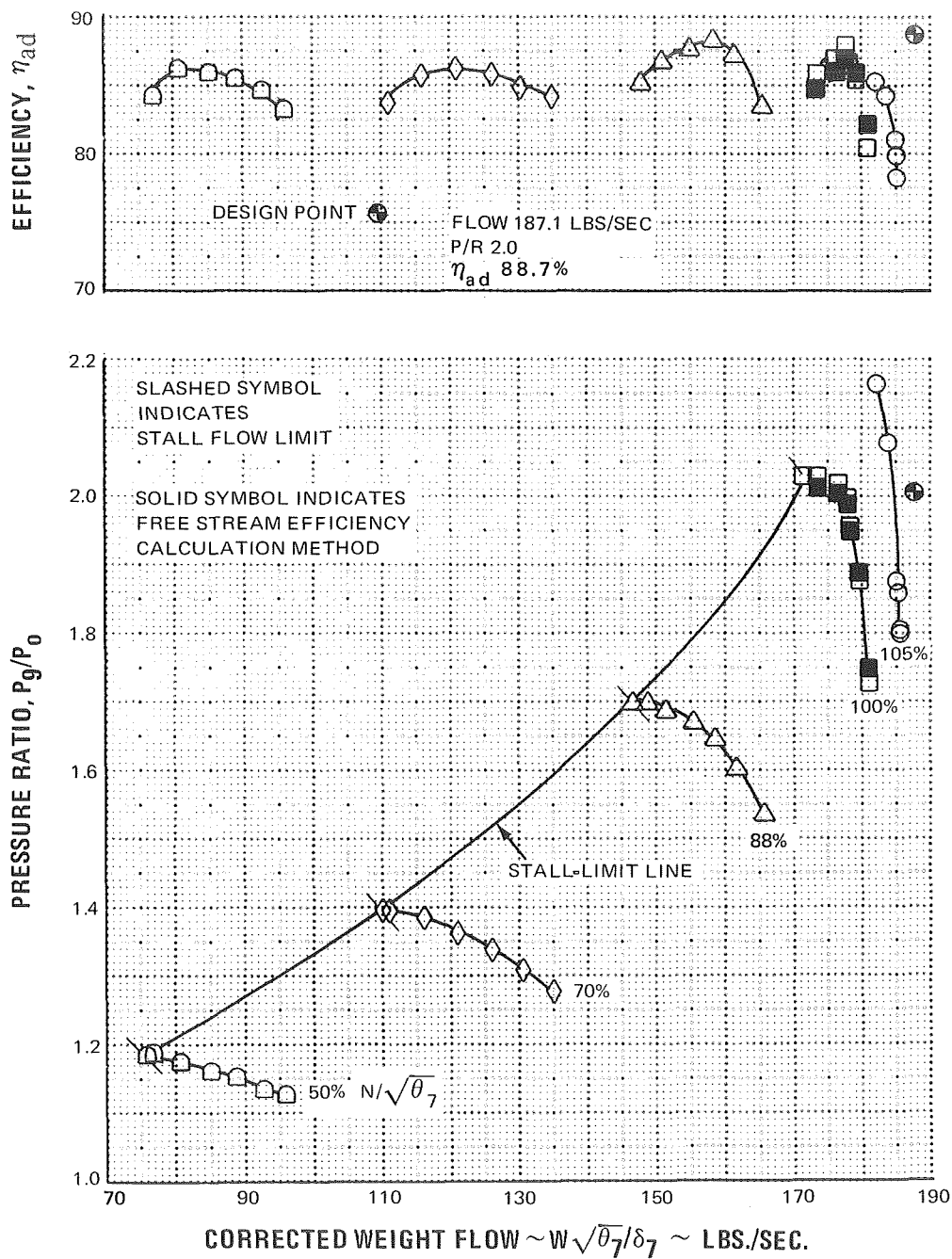


Figure 13 Rotor Overall Performance With Uniform Inlet Flow

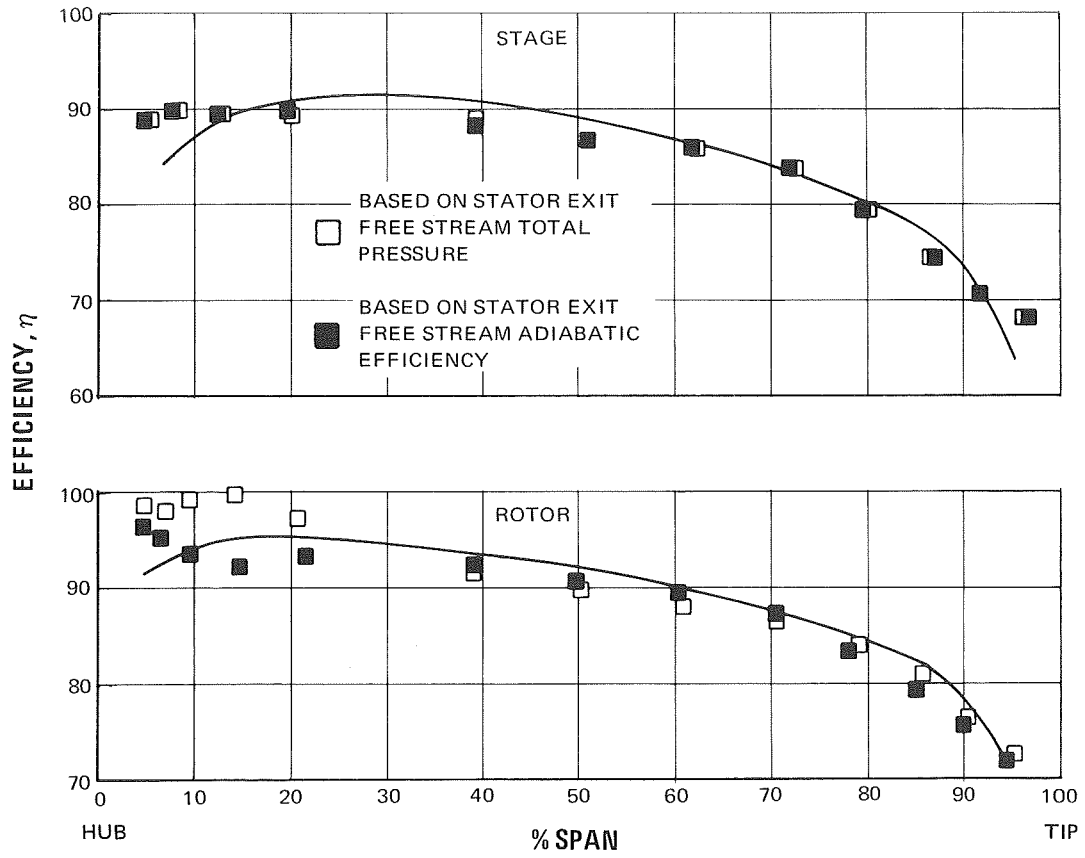


Figure 14 Rotor and Stage Spanwise Efficiency

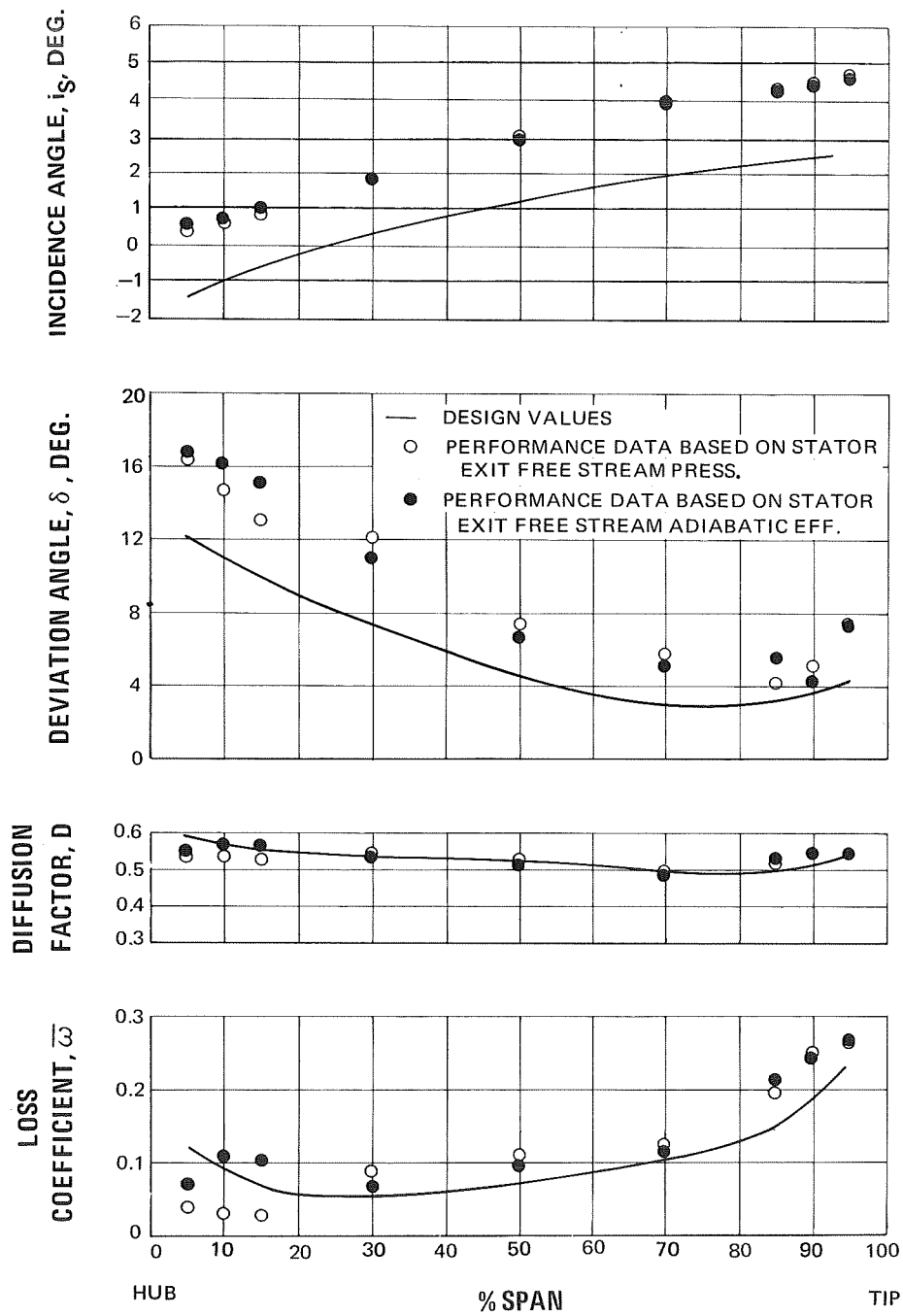


Figure 15 Comparison of Spanwise Rotor Blade Element Performance

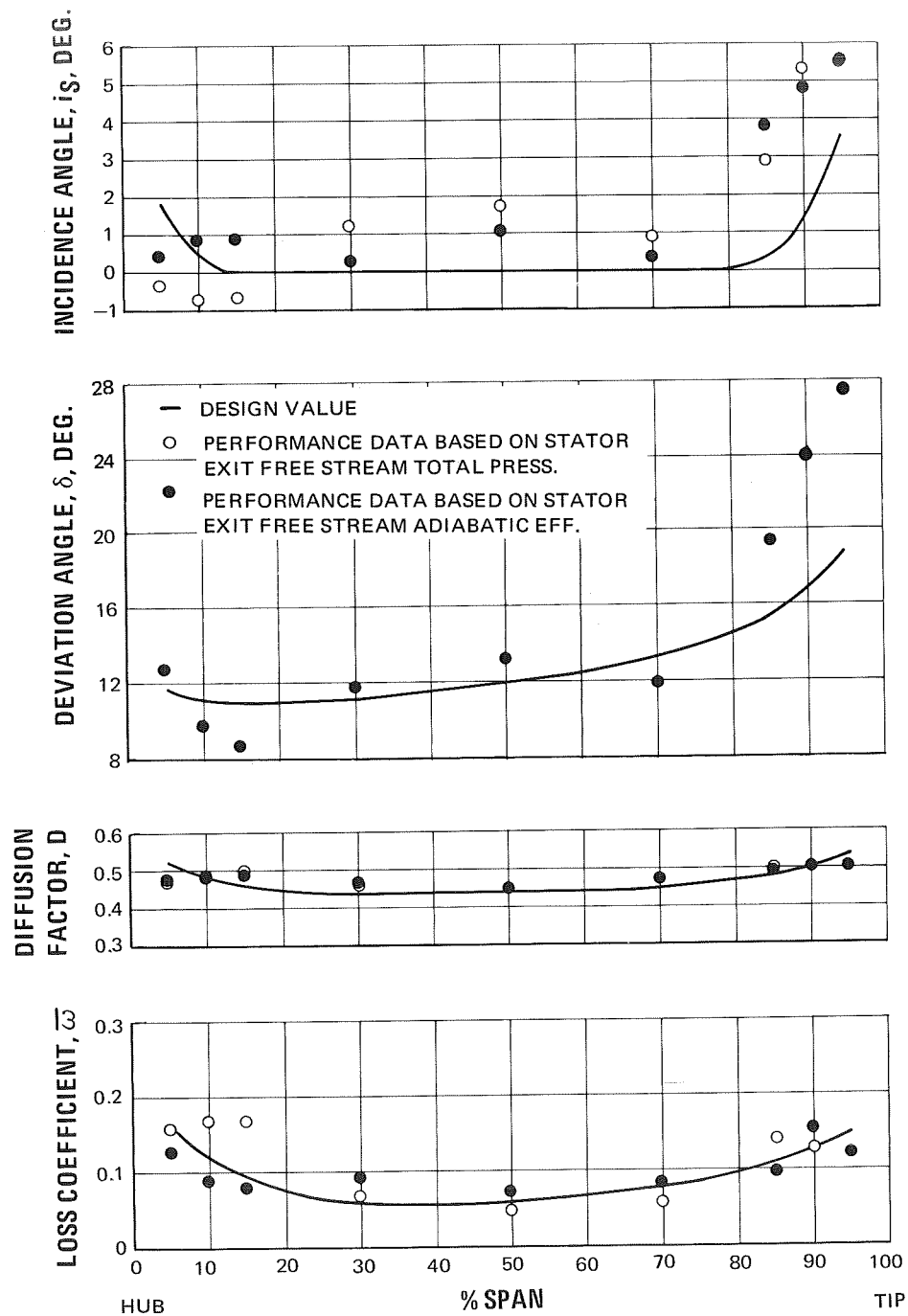


Figure 16 Comparison of Spanwise Stator Blade Element Performance

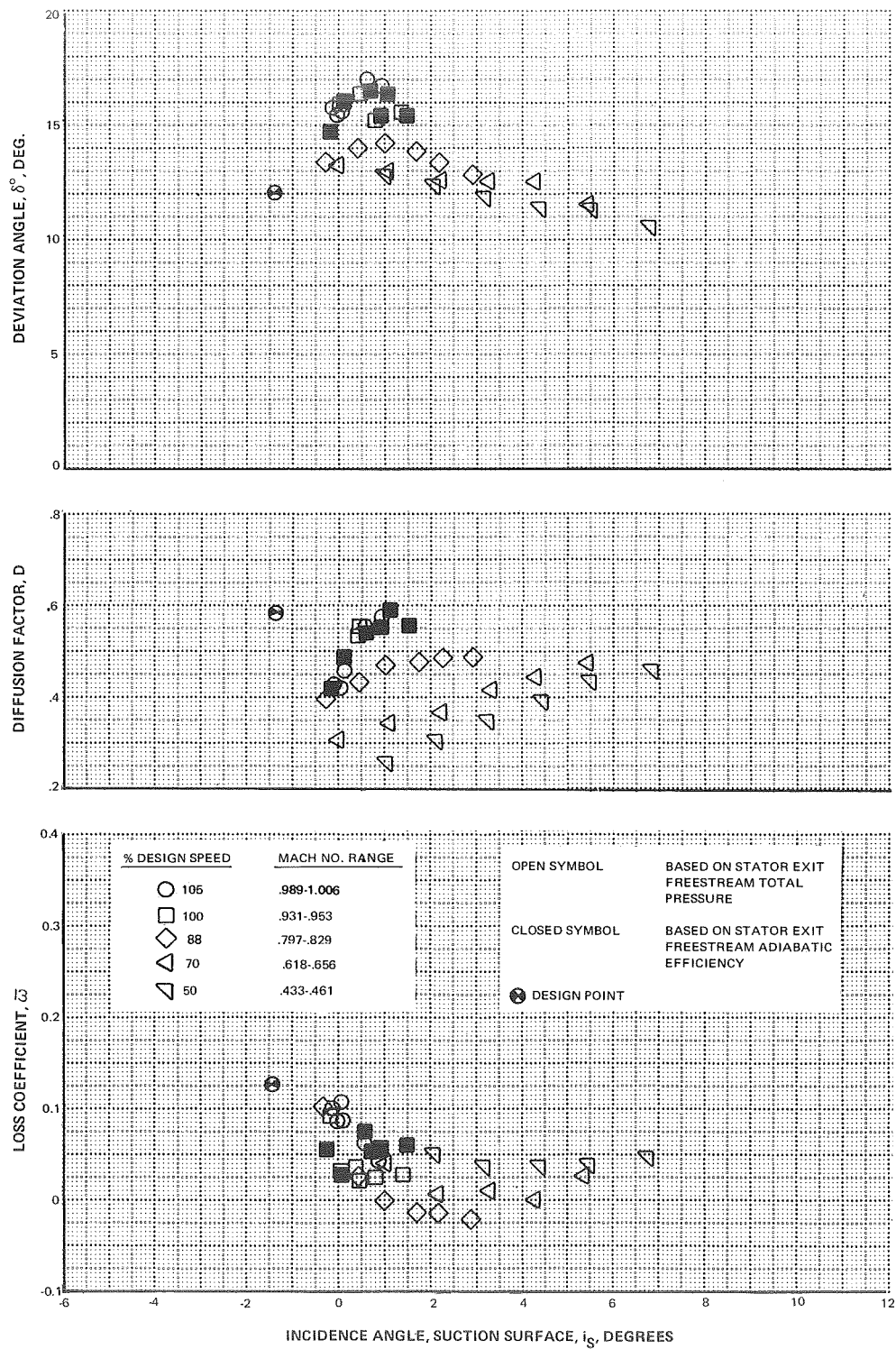


Figure 17a Rotor Blade Element Performance with Uniform Inlet Flow, 5 Percent Span From Hub

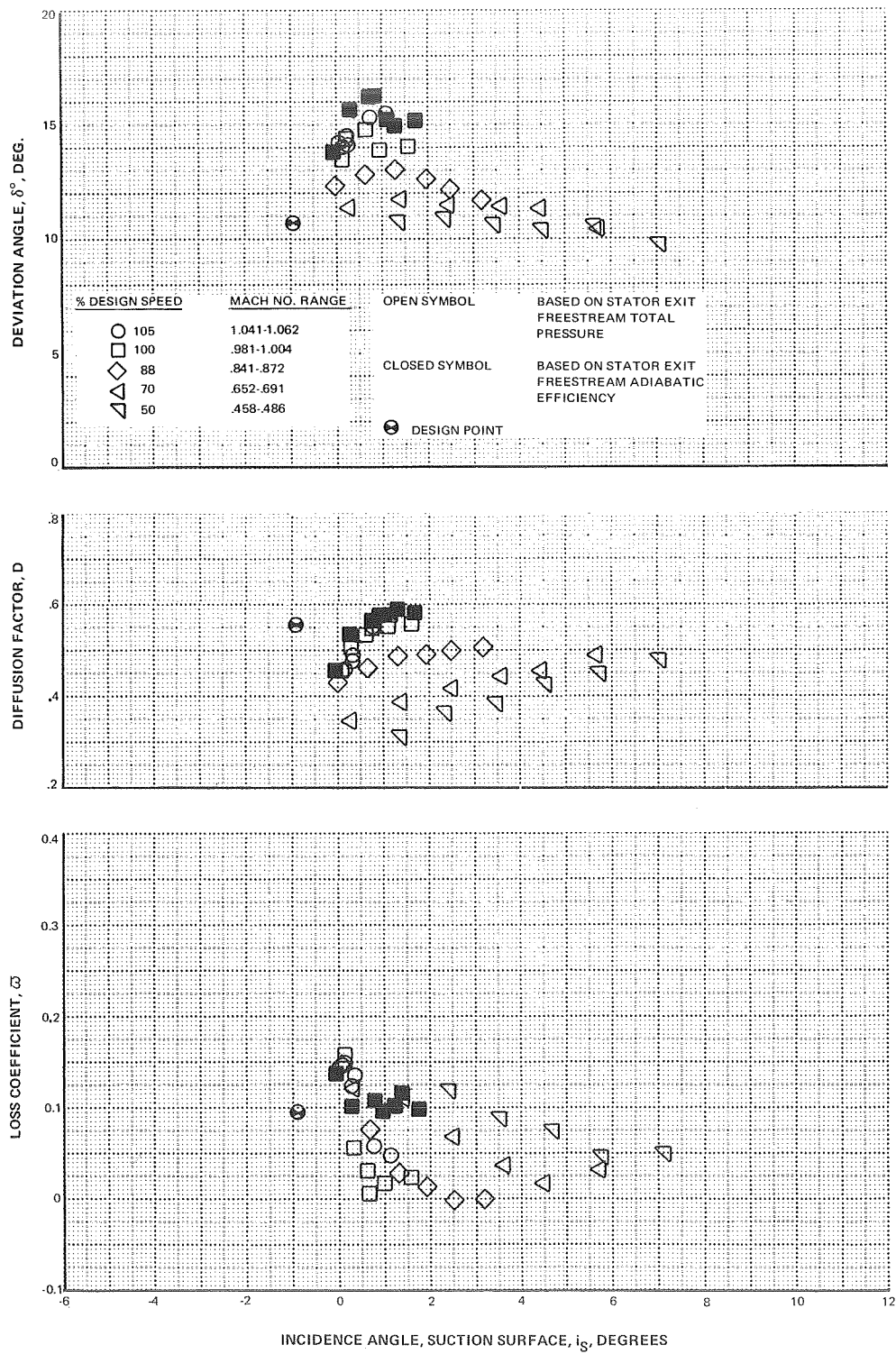


Figure 17b Rotor Blade Element Performance with Uniform Inlet Flow, 10 Percent Span From Hub

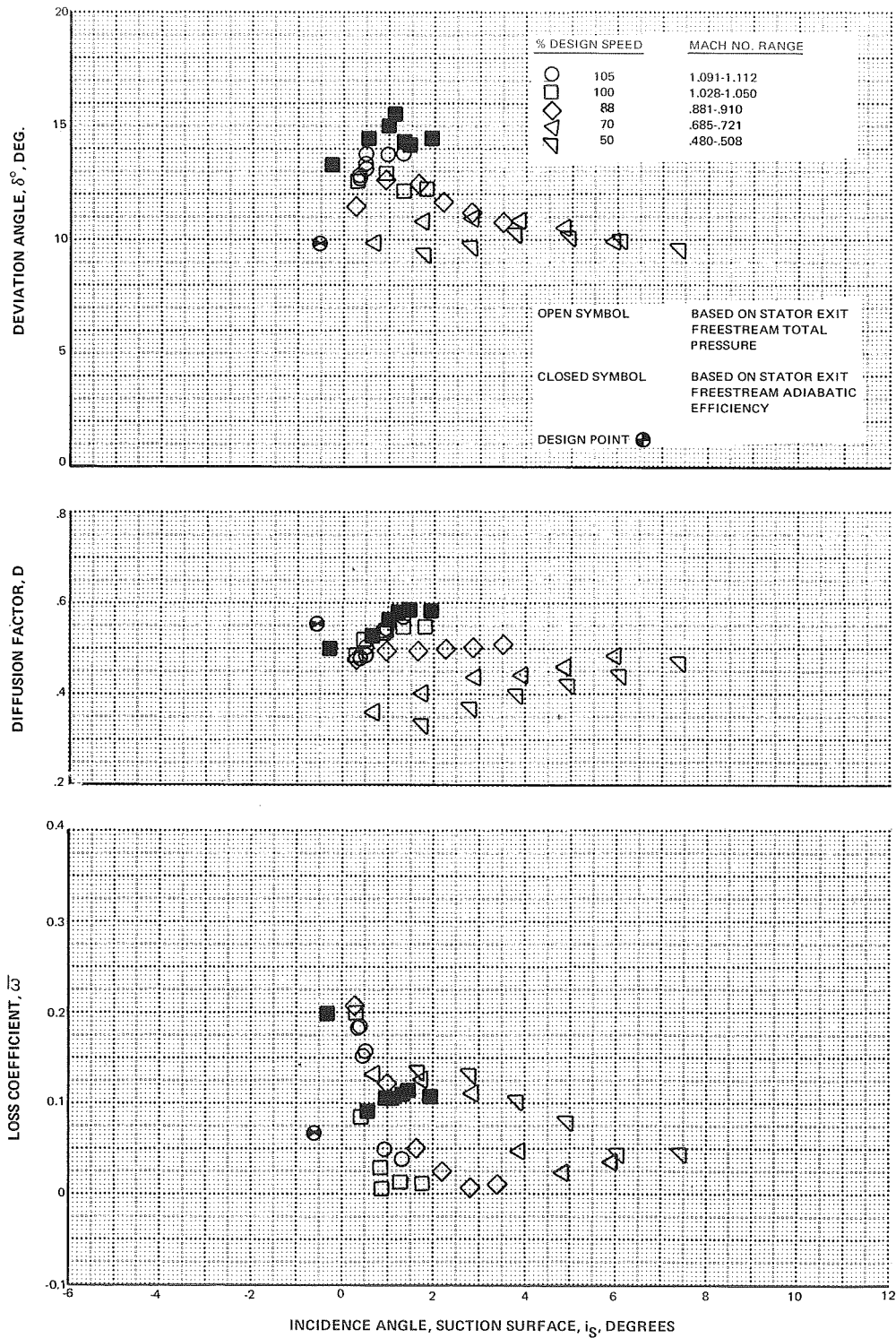


Figure 17c Rotor Blade Element Performance with Uniform Inlet Flow, 15 Percent Span From Hub

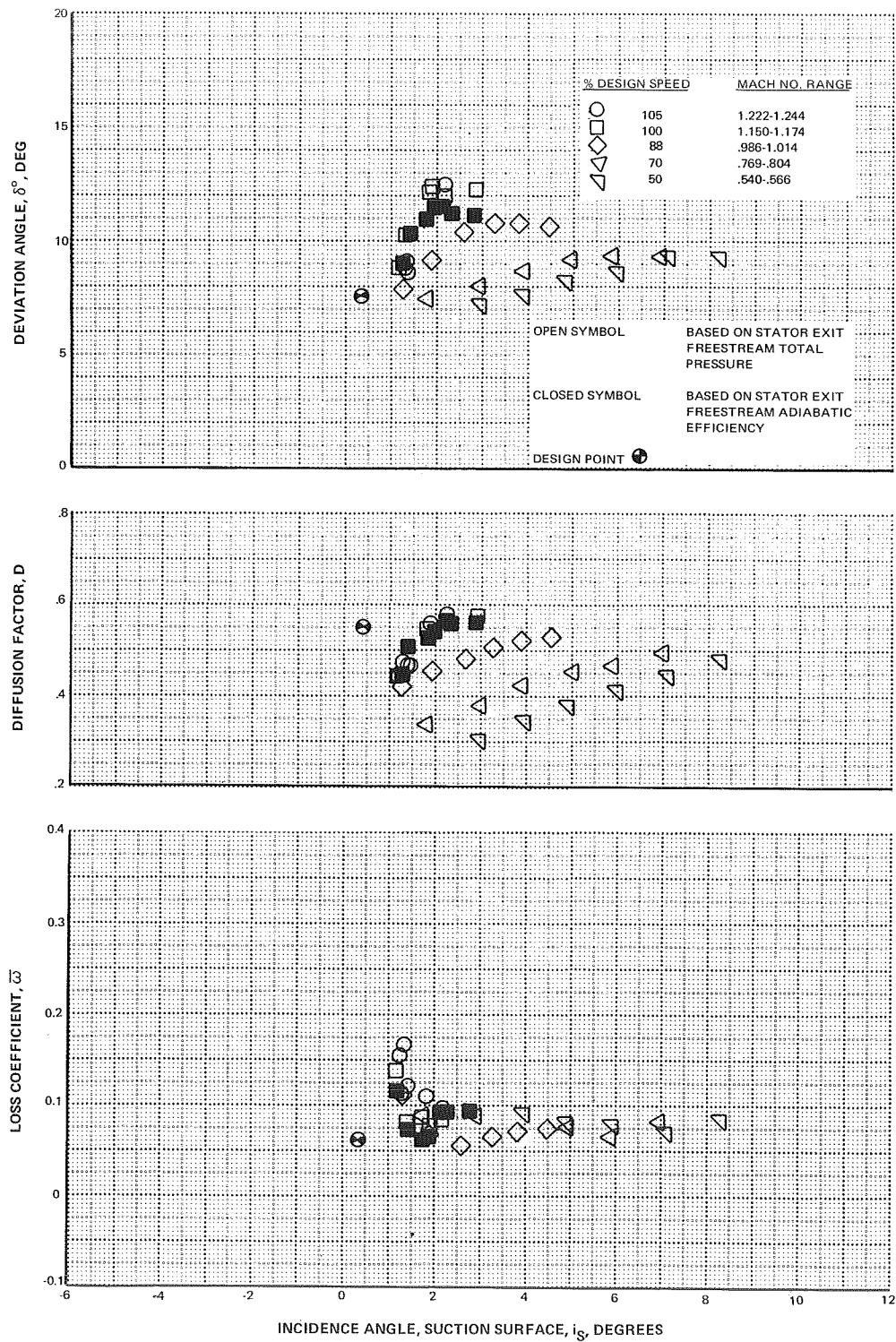


Figure 17d Rotor Blade Element Performance with Uniform Inlet Flow, 30 Percent Span From Hub

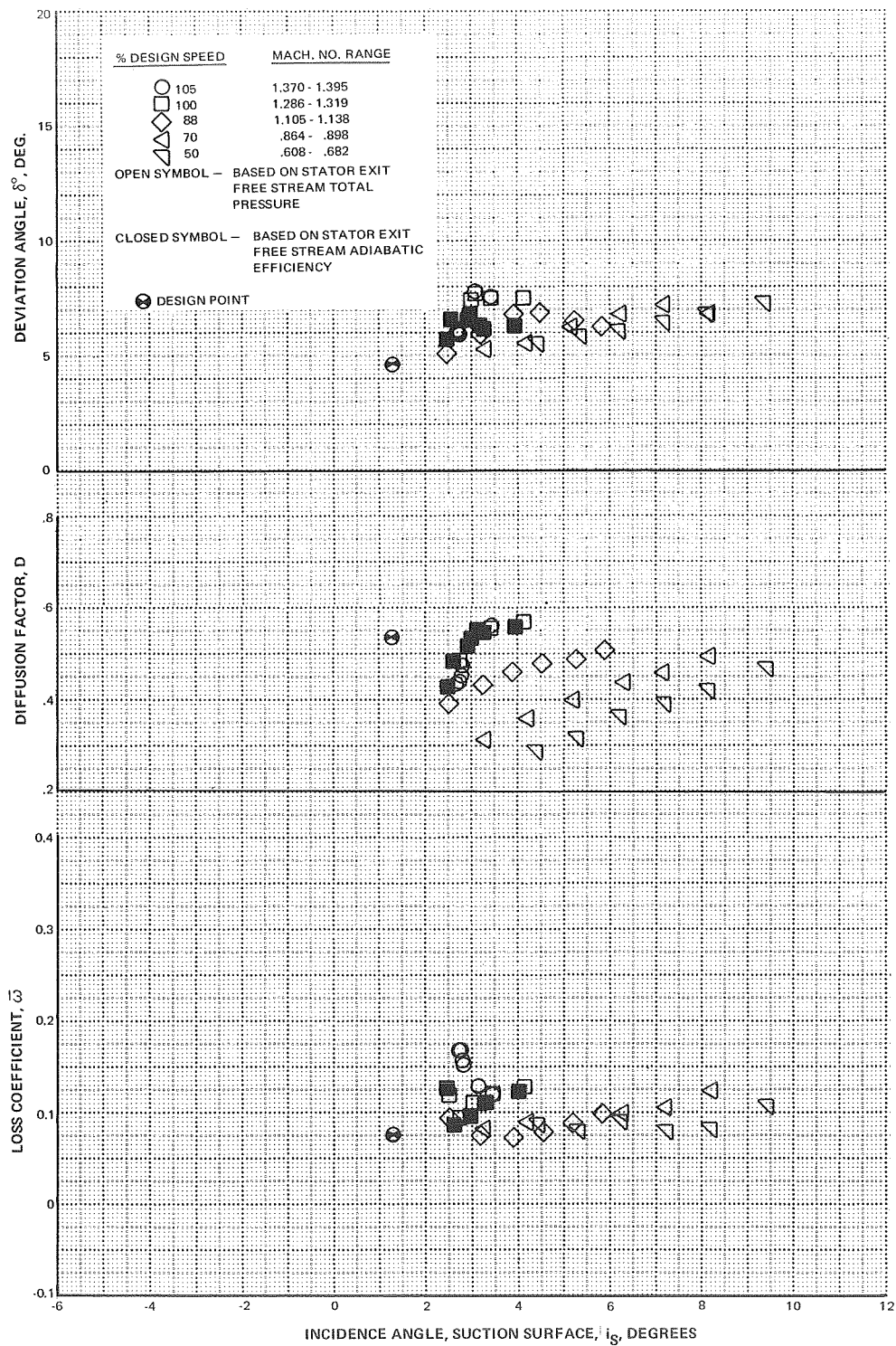


Figure 17e Rotor Blade Element Performance with Uniform Inlet Flow, 50 Percent Span From Hub

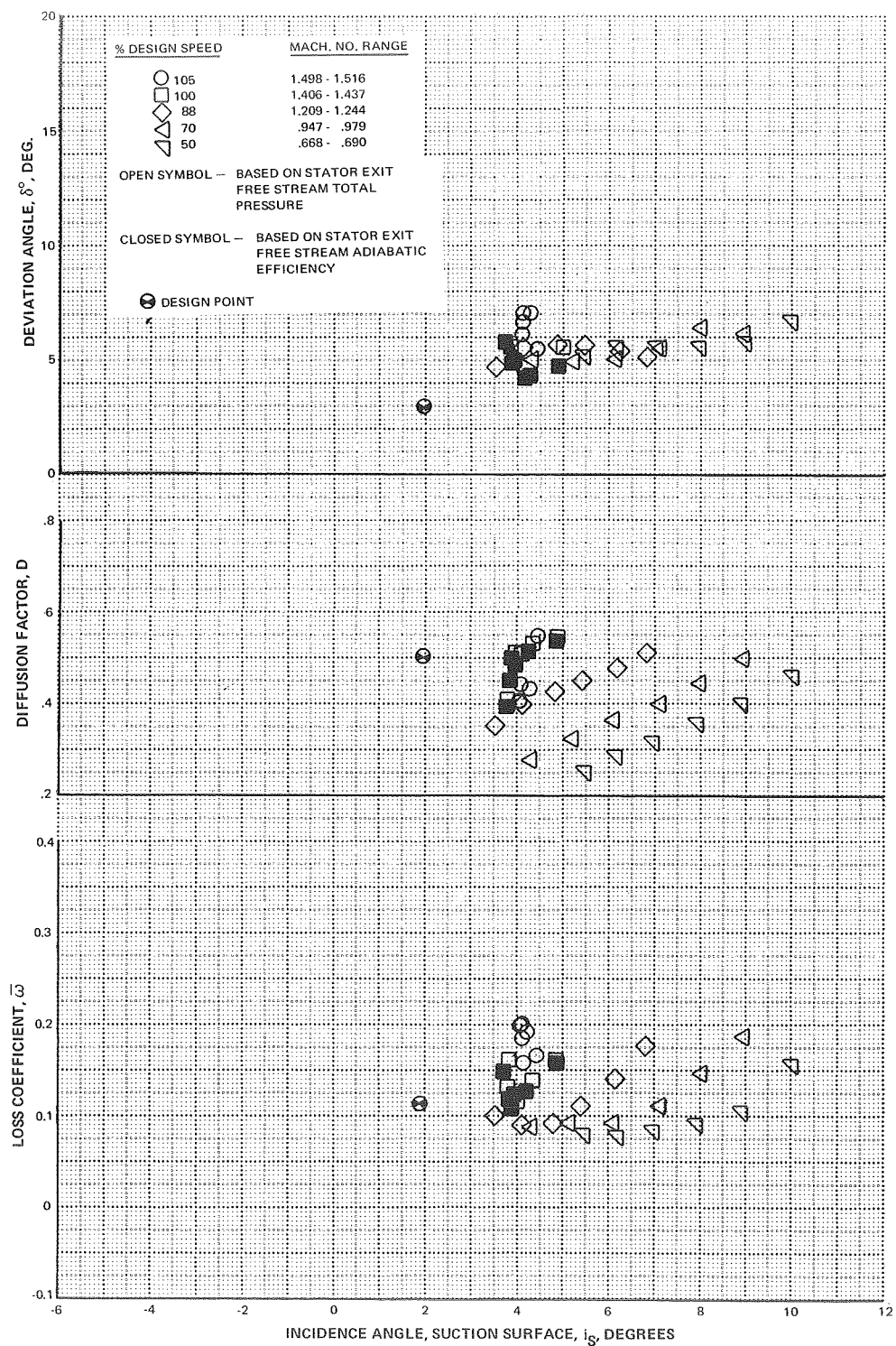


Figure 17f Rotor Blade Element Performance with Uniform Inlet Flow, 70 Percent Span From Hub

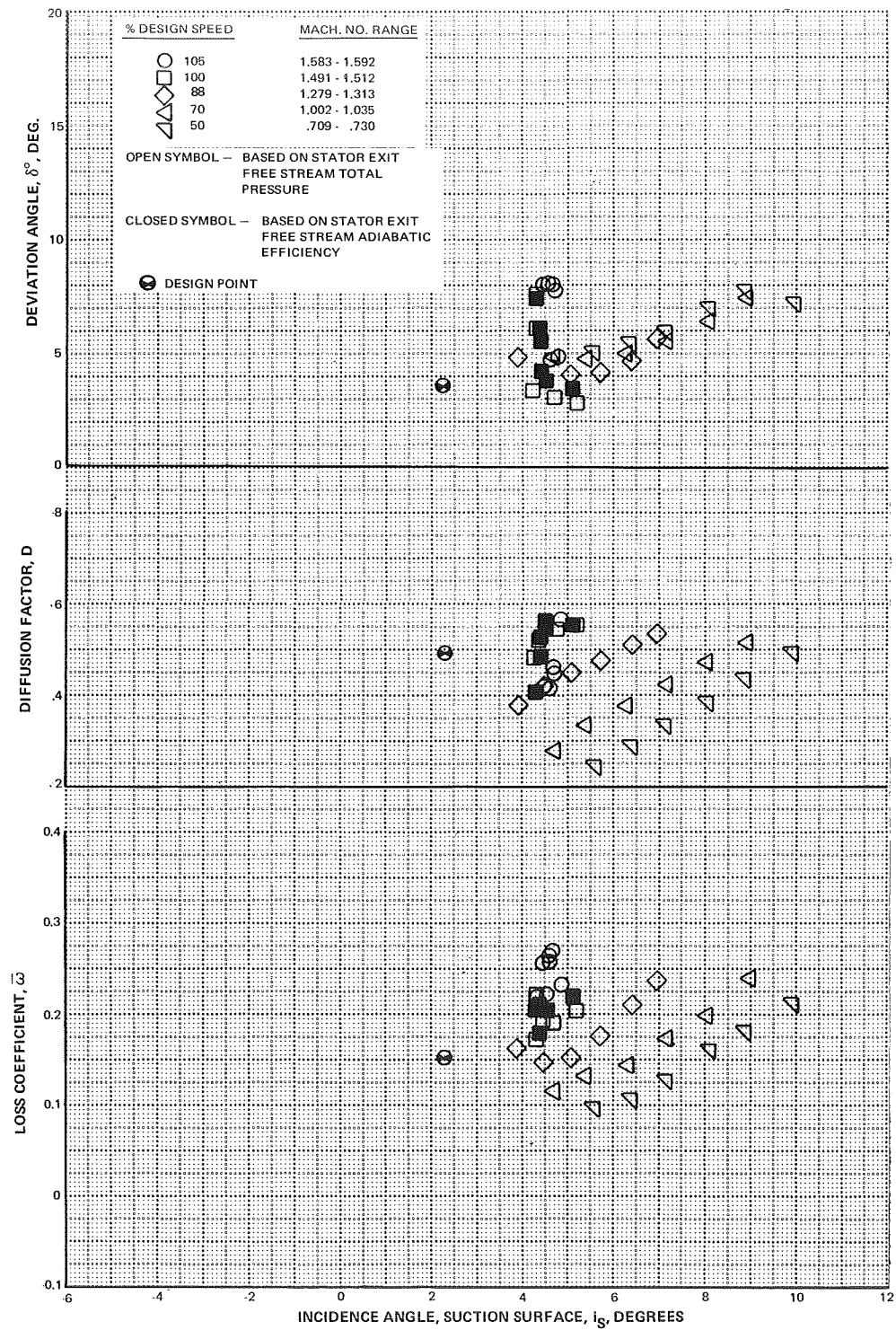


Figure 17g Rotor Blade Element Performance with Uniform Inlet Flow, 85 Percent Span From Hub

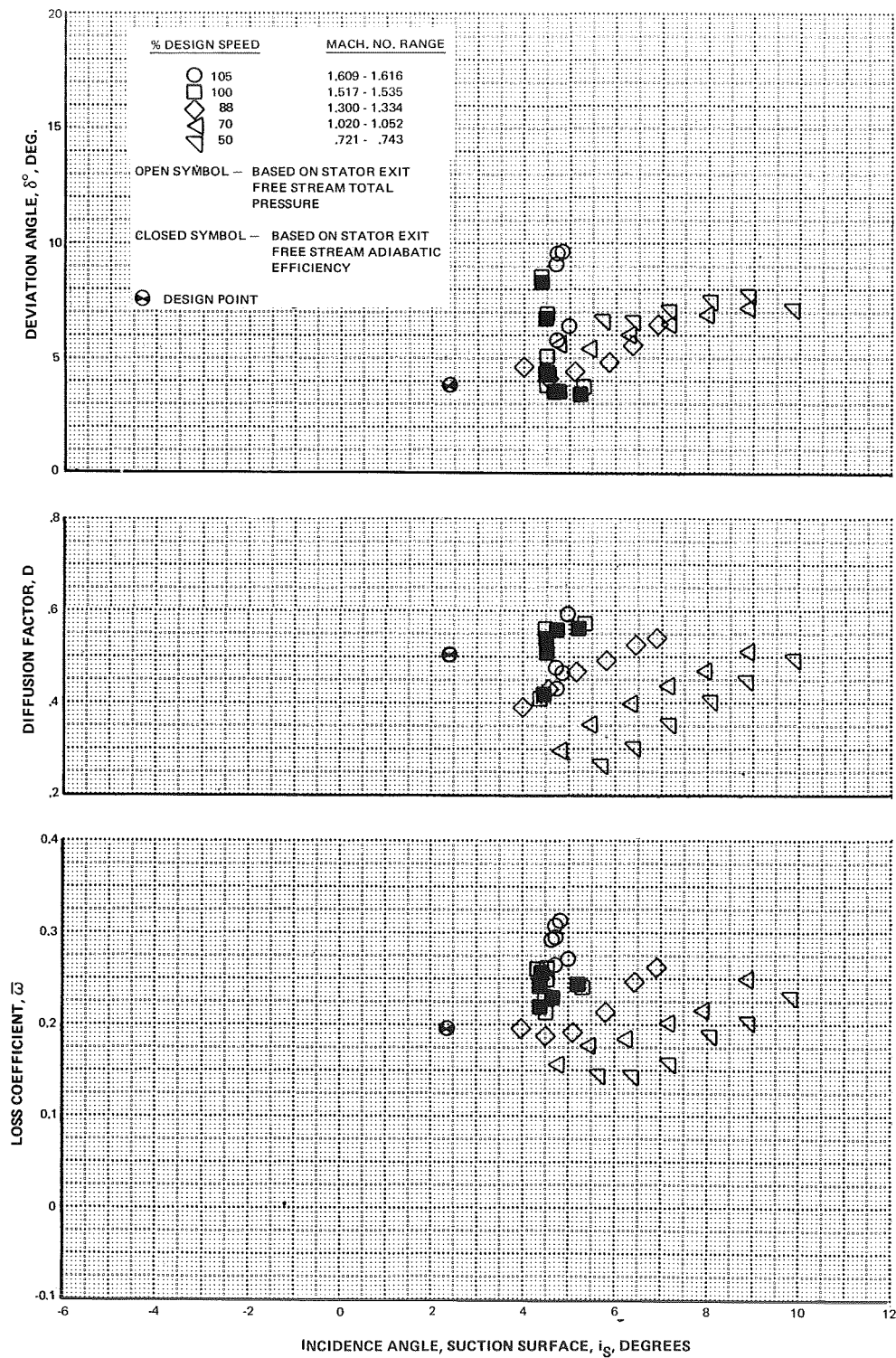


Figure 17h Rotor Blade Element Performance with Uniform Inlet Flow, 90 Percen Span From Hub

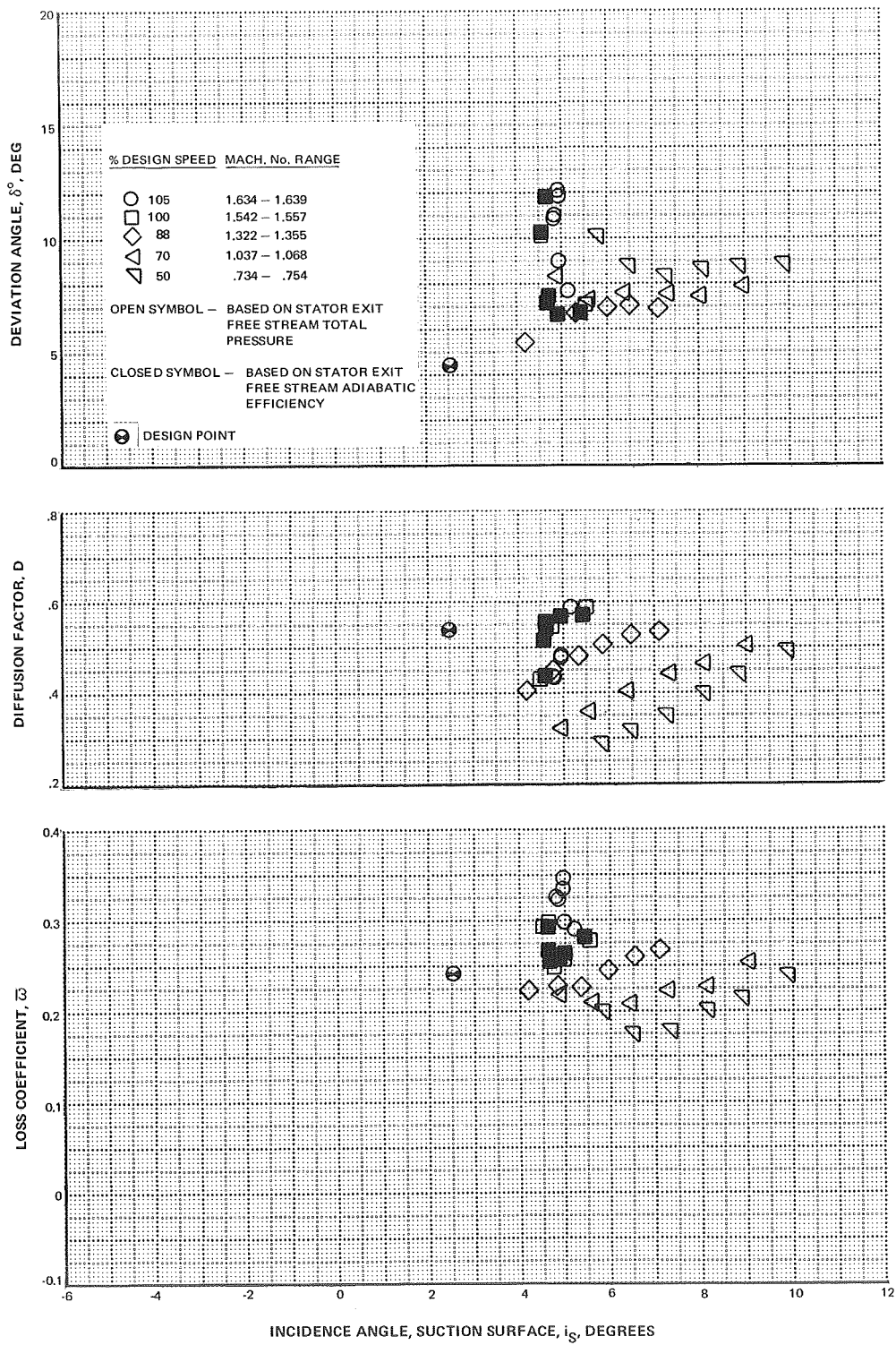


Figure 17i Rotor Blade Element Performance with Uniform Inlet Flow, 95 Percent Span From Hub

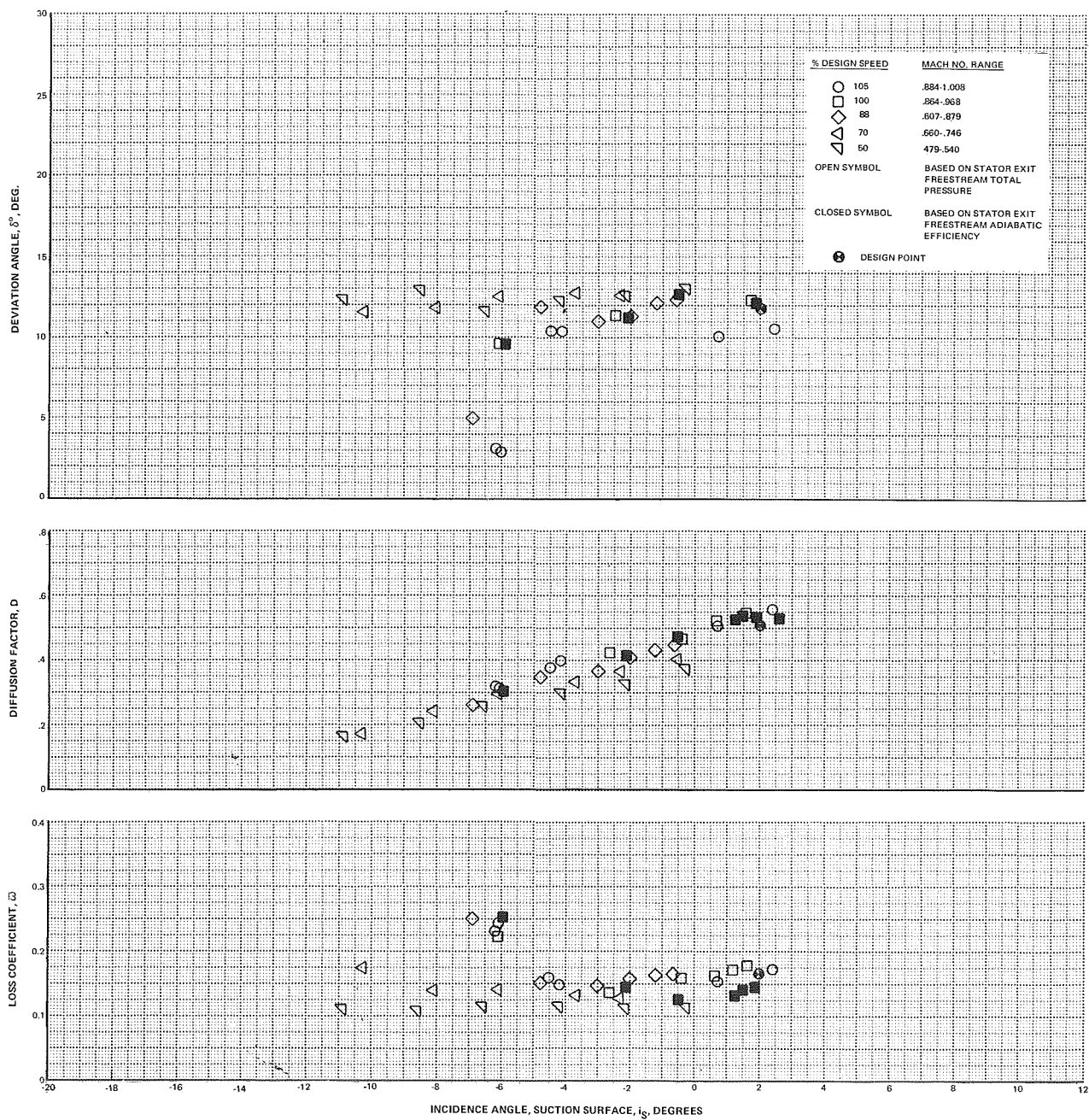


Figure 18a Stator Blade Element Performance with Uniform Inlet Flow, 5 Percent Span From Hub

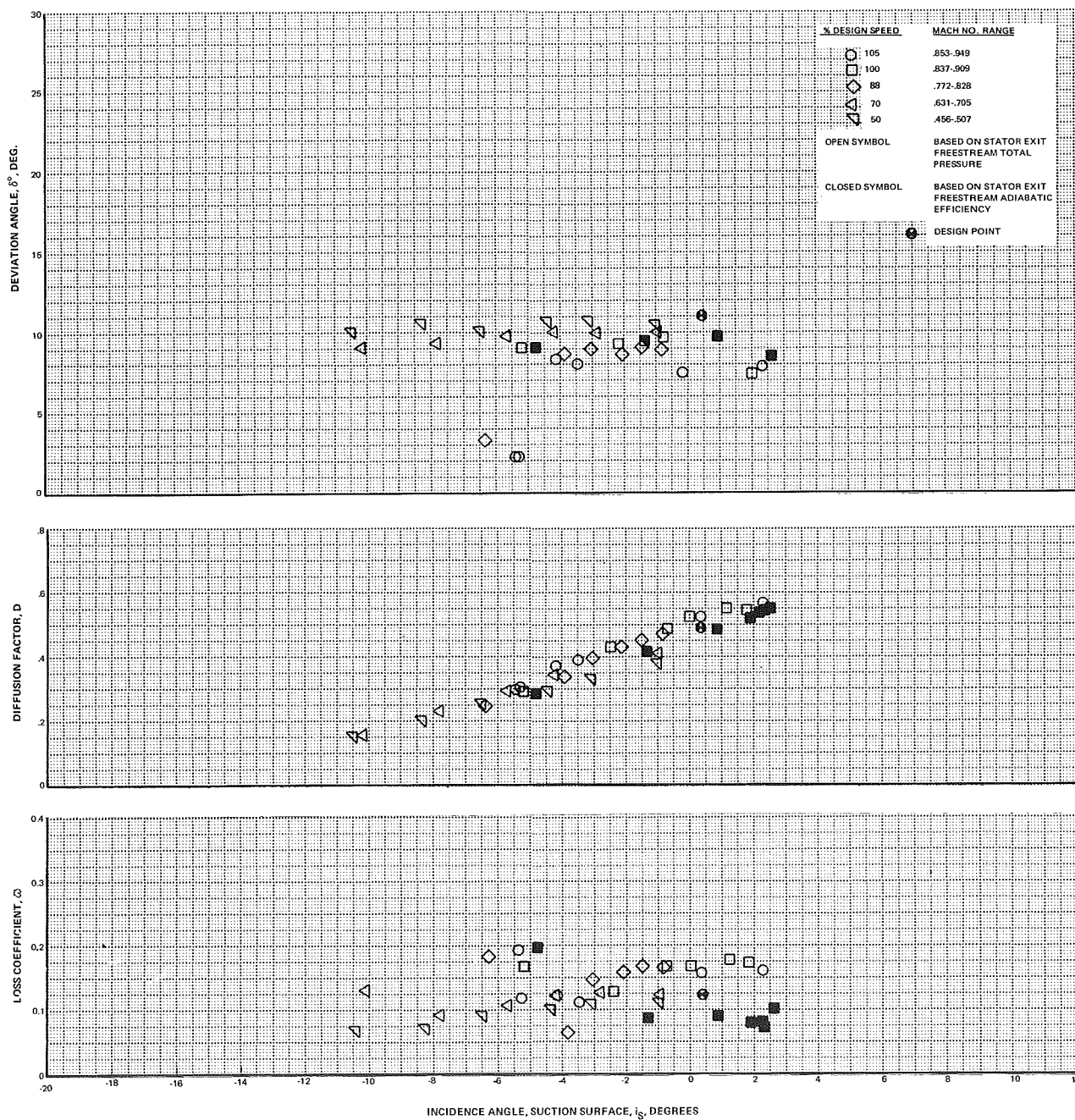


Figure 18b Stator Blade Element Performance with Uniform Inlet Flow, 10 Percent Span From Hub

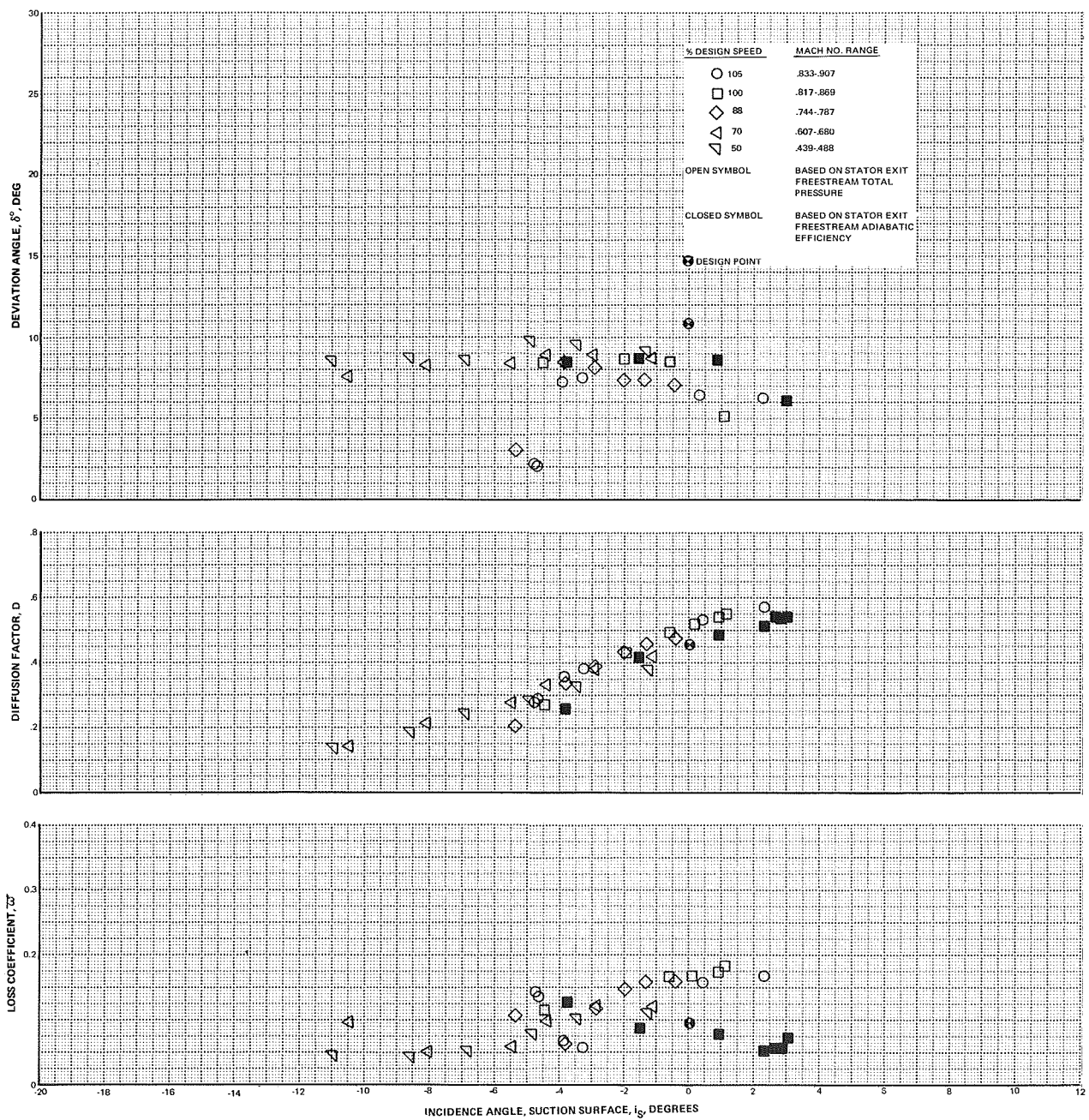


Figure 18c Stator Blade Element Performance with Uniform Inlet Flow, 15 Percent Span From Hub

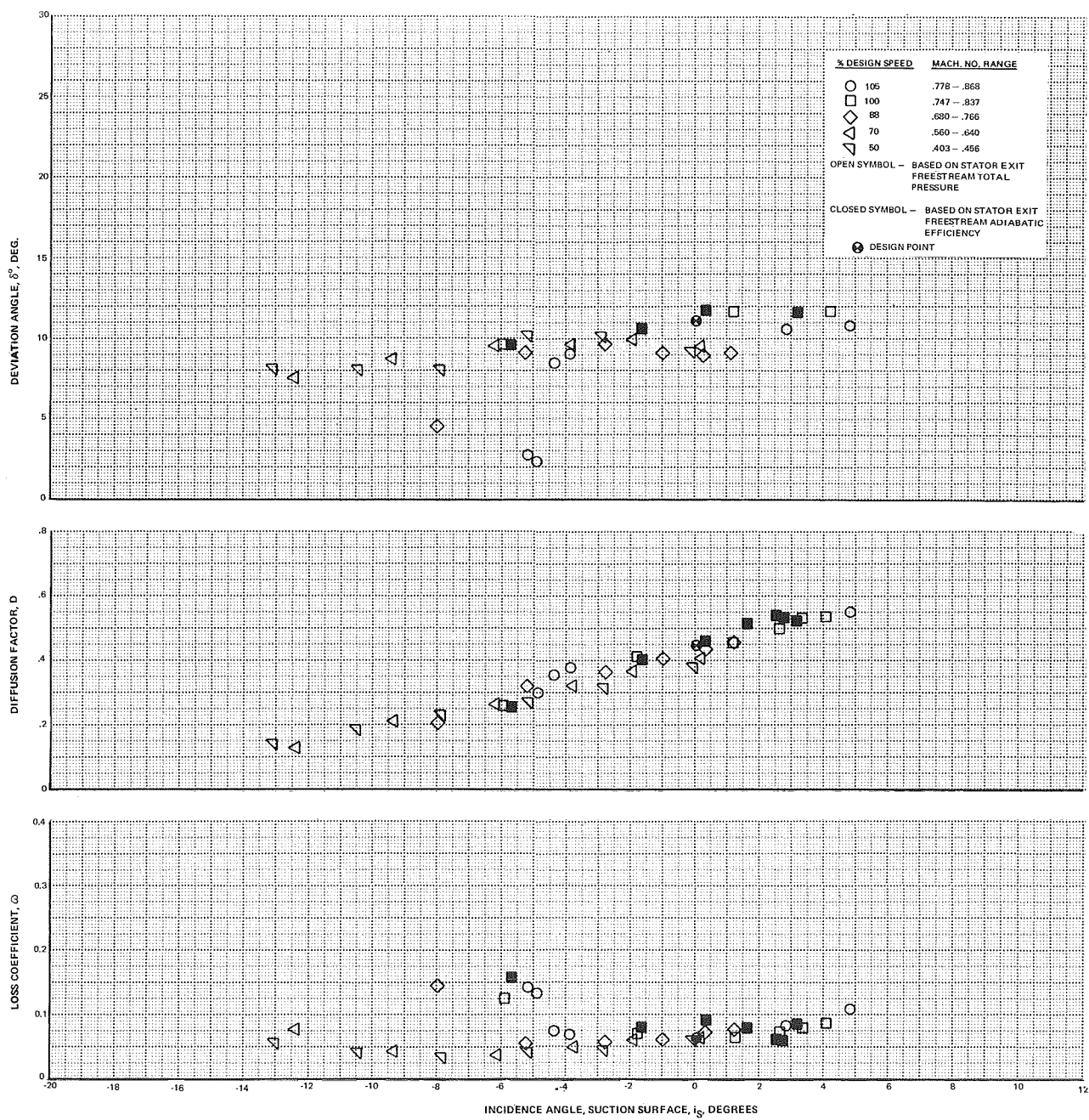


Figure 18d Stator Blade Element Performance with Uniform Inlet Flow, 30 Percent Span From Hub

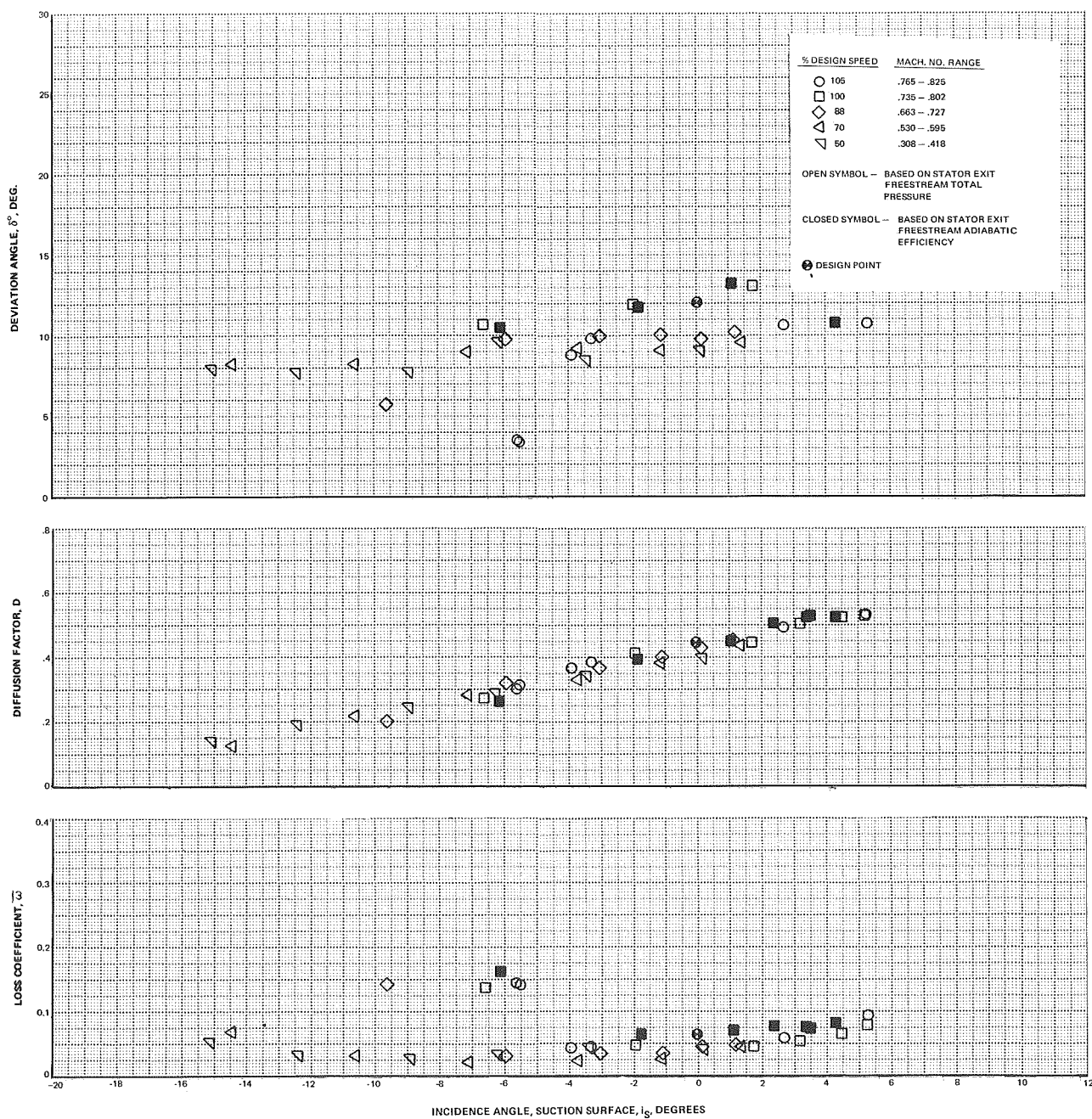


Figure 18e Stator Blade Element Performance with Uniform Inlet Flow, 50 Percent Span From Hub

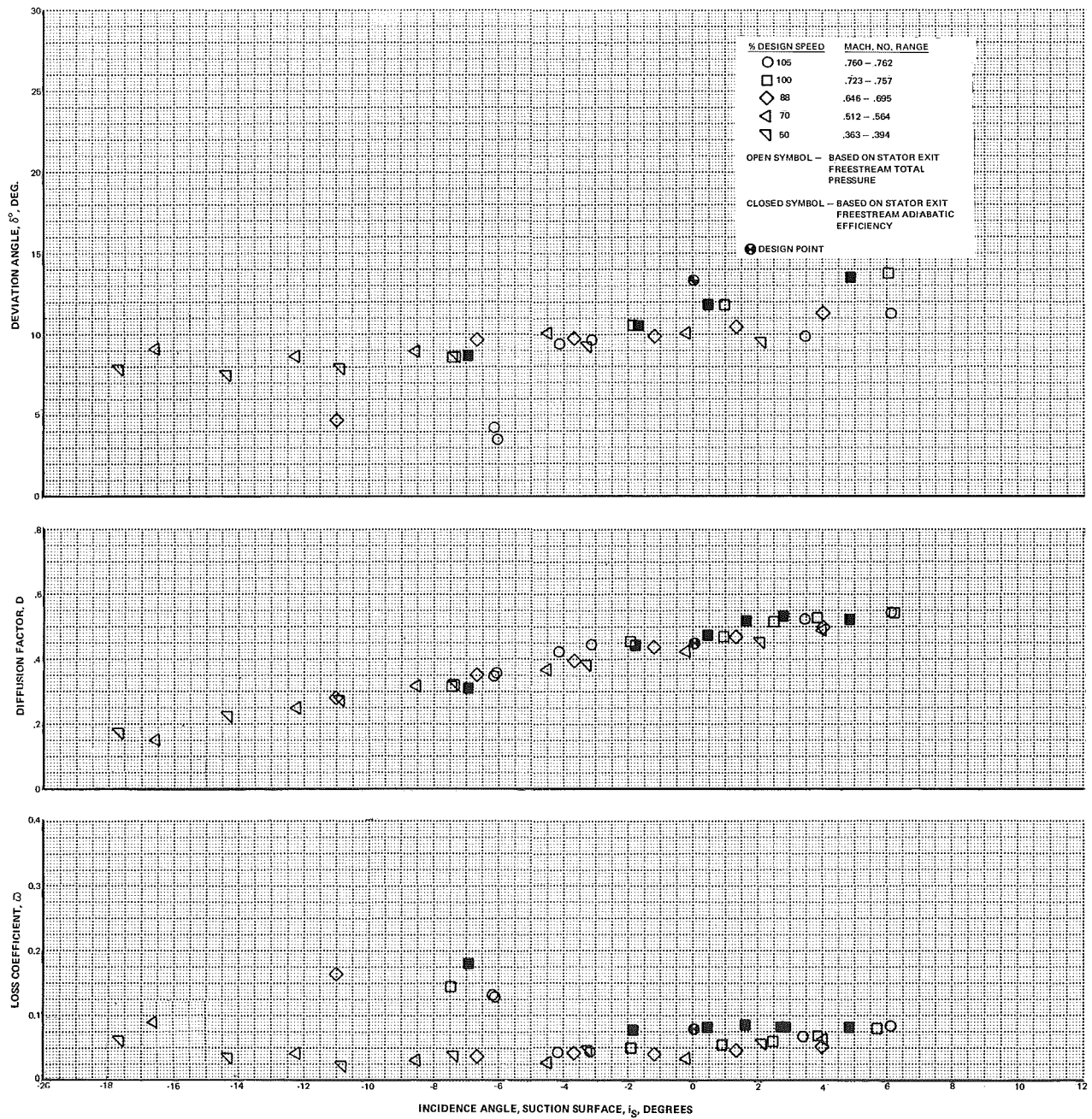


Figure 18f Stator Blade Element Performance with Uniform Inlet Flow, 70 Percent Span From Hub

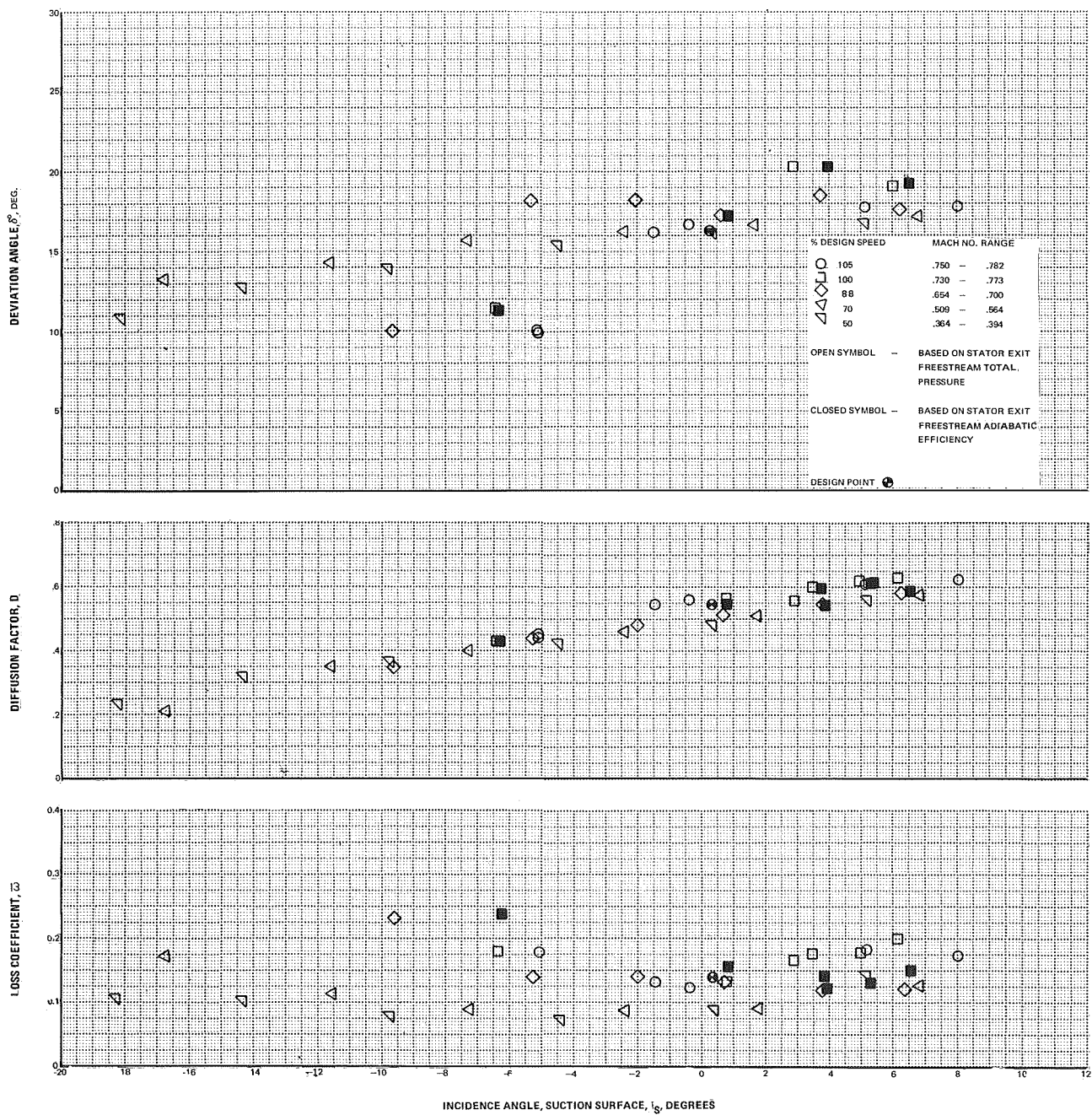


Figure 18g Stator Blade Element Performance with Uniform Inlet Flow, 85 Percent Span From Hub

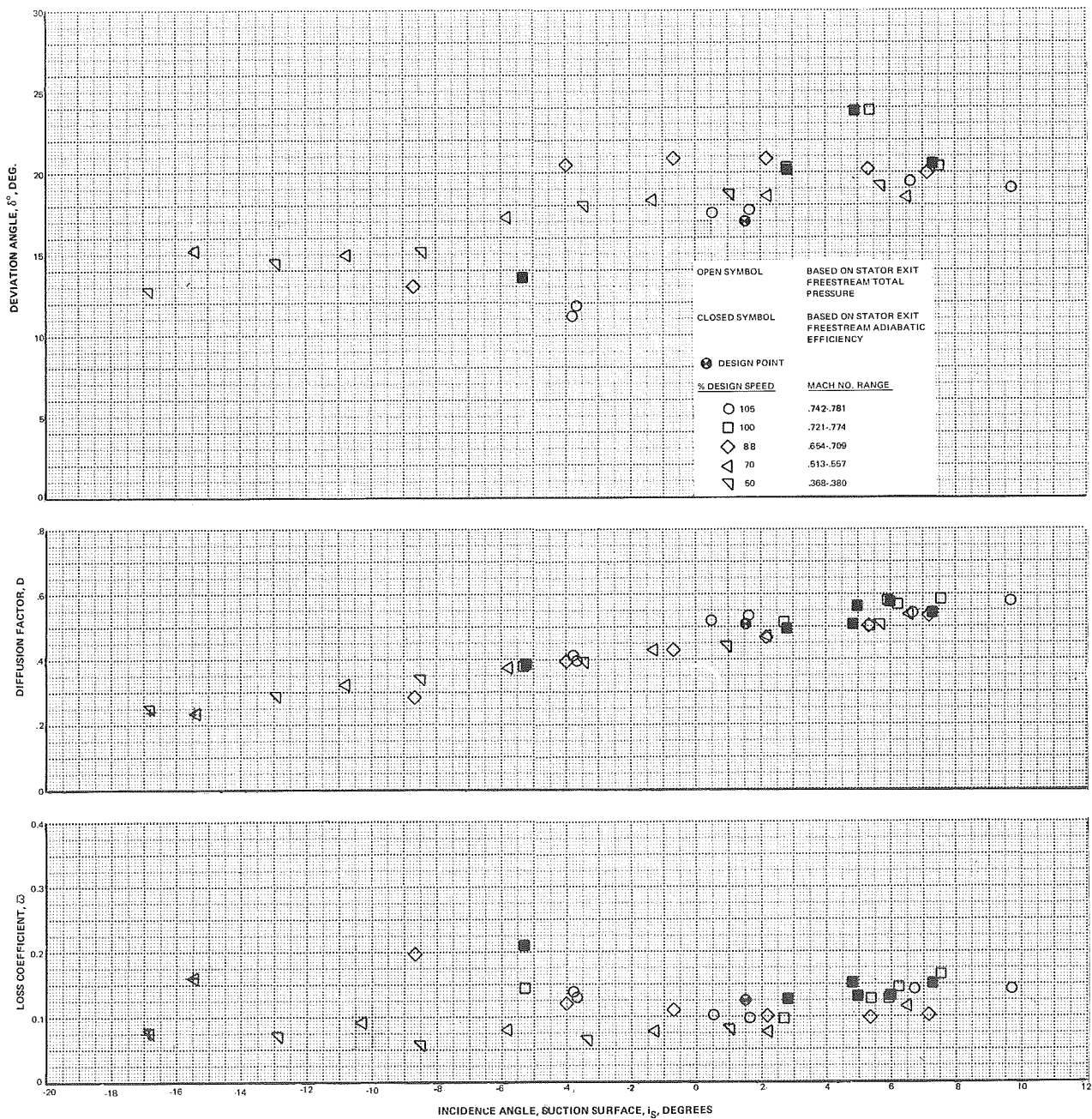


Figure 18h Stator Blade Element Performance with Uniform Inlet Flow, 90 Percent Span From Hub

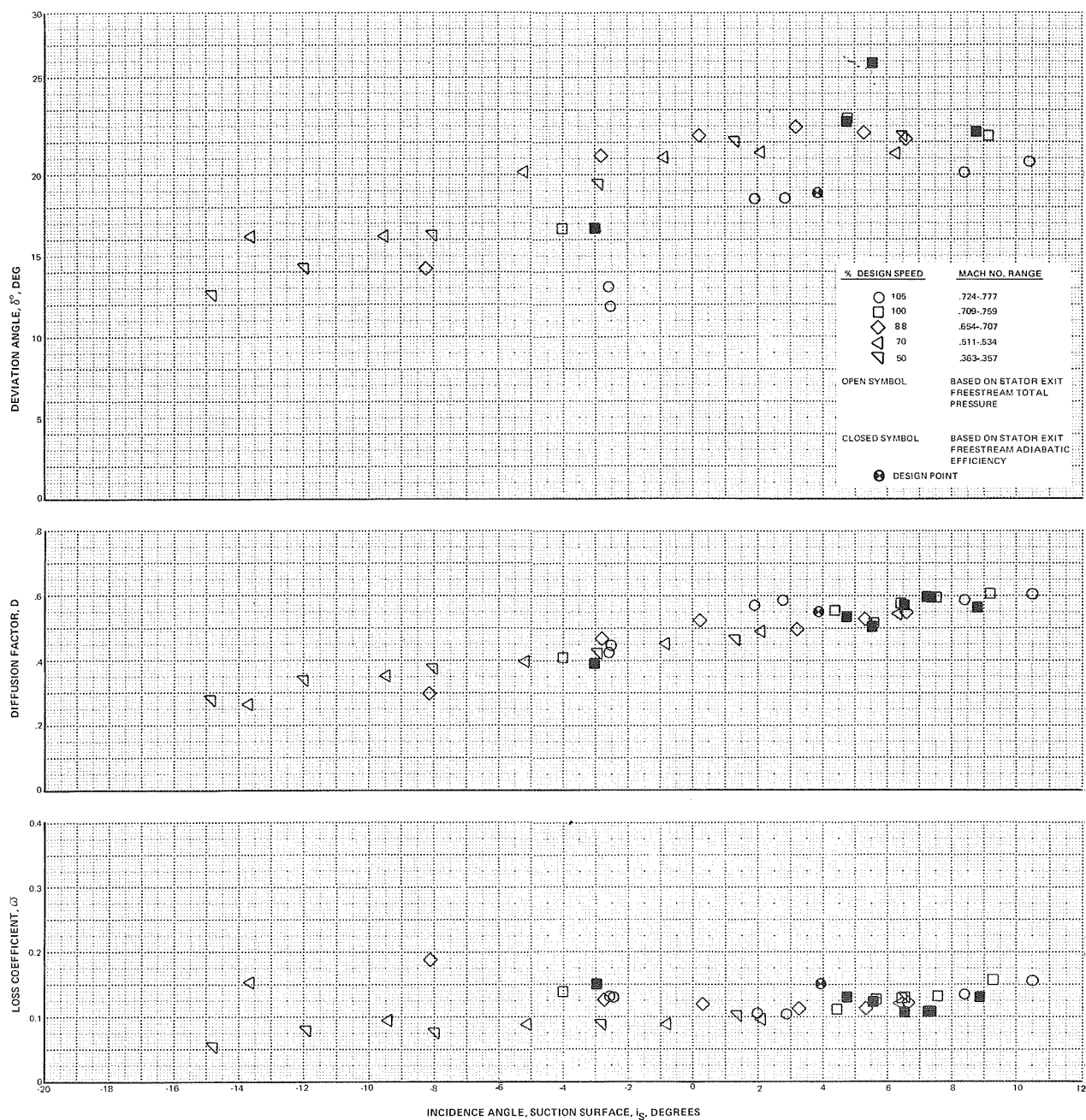


Figure 18i Stator Blade Element Performance with Uniform Inlet Flow, 95 Percent Span From Hub

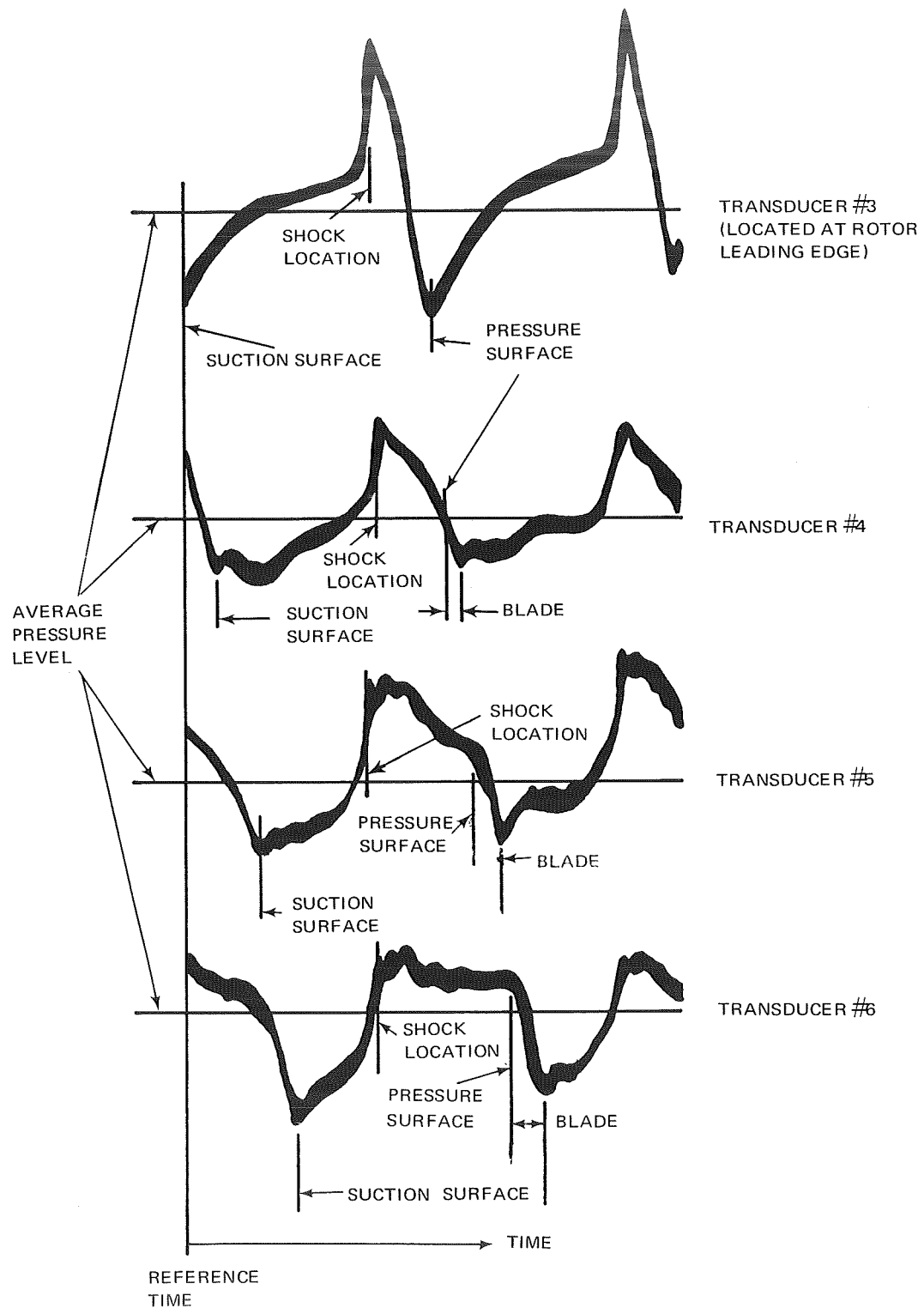


Figure 19 Typical Oscillograph Traces Showing Pressure of Shock Over Blade Tip

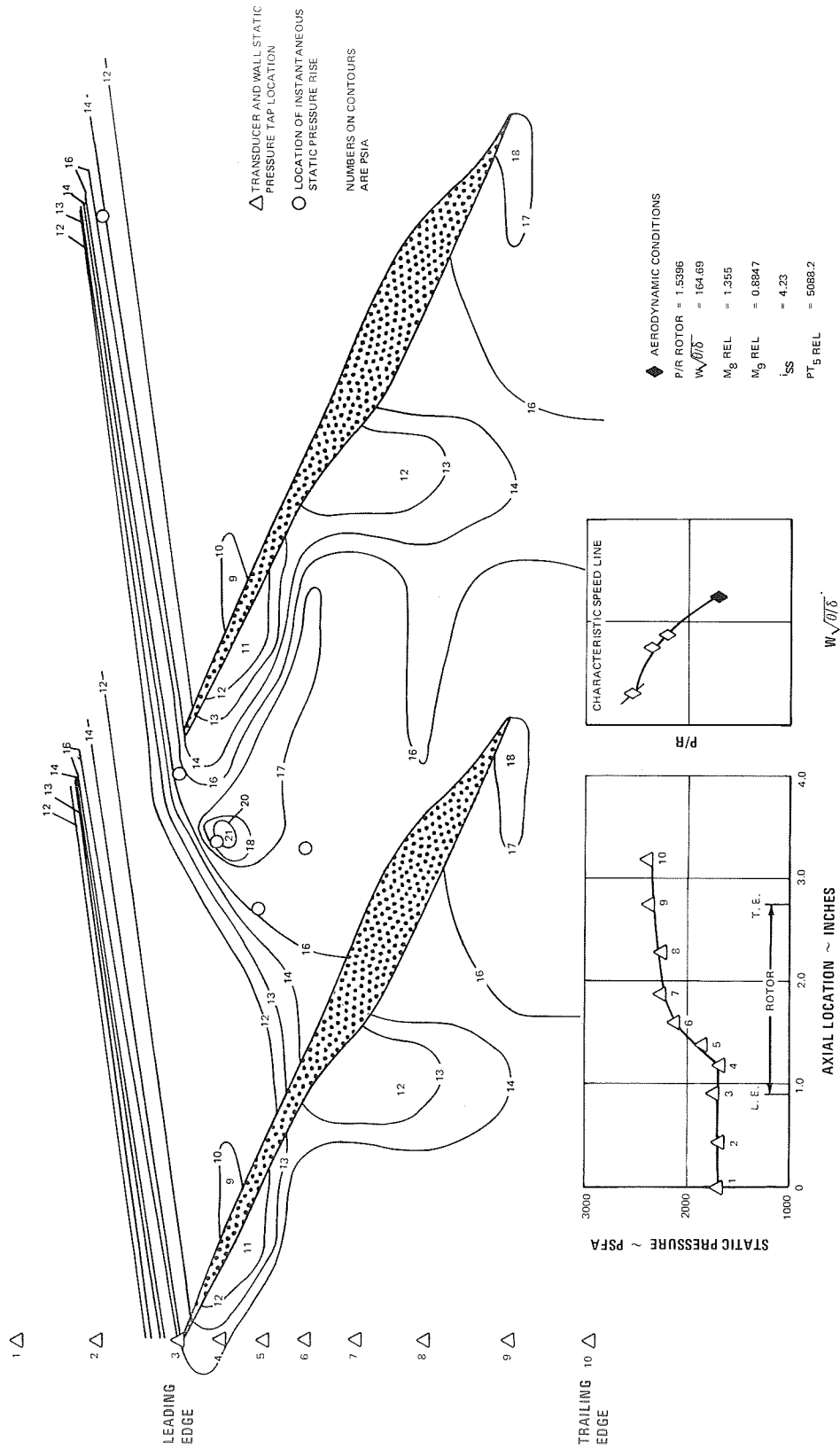


Figure 20a Rotor Blade Tip Static Pressure Contours, 88 Percent Speed, Flow Rate 164.69 Pounds Per Second

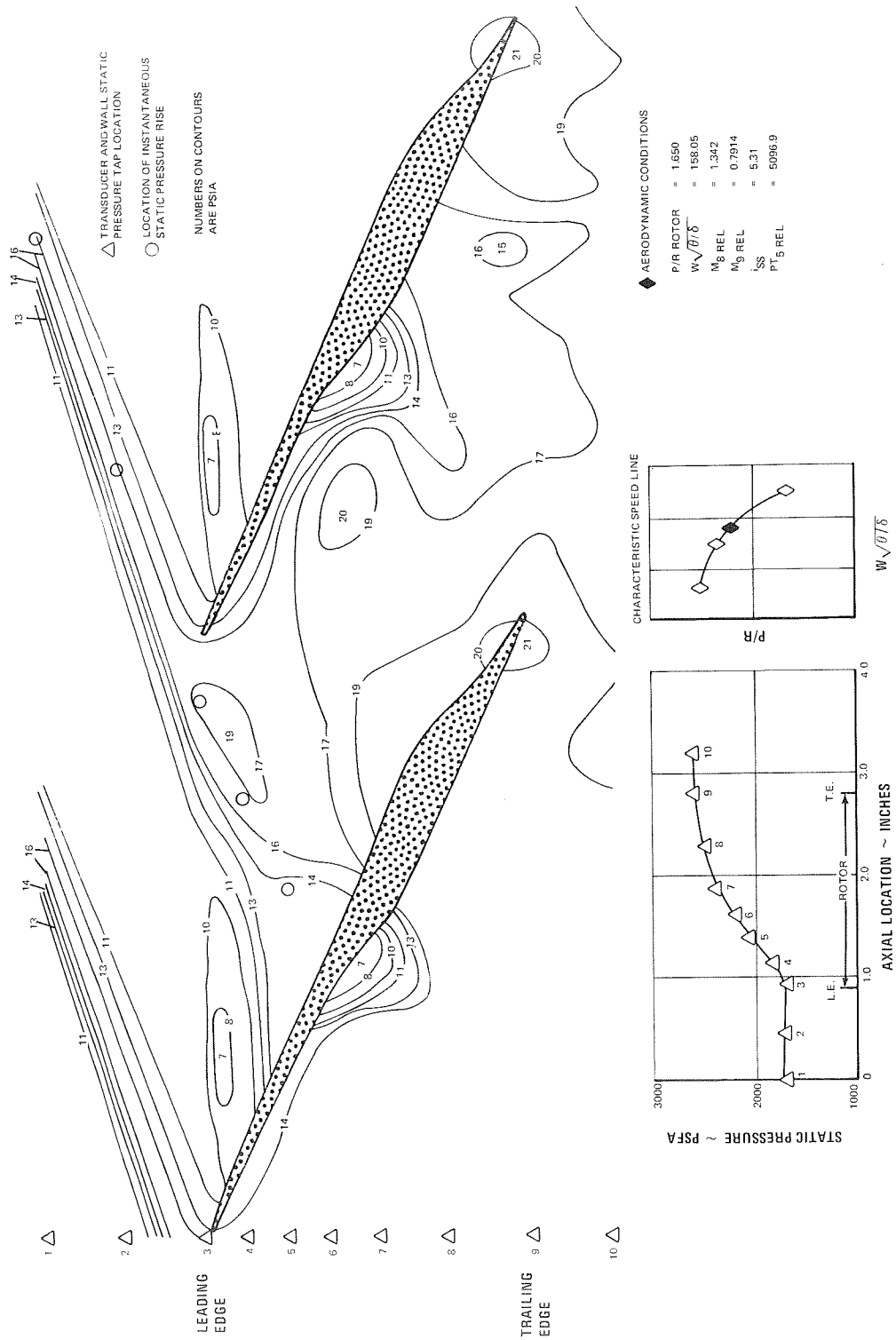


Figure 20b Rotor Blade Tip Static Pressure Contours, 88 Percent Speed, Flow Rate 158.05 Pounds Per Second

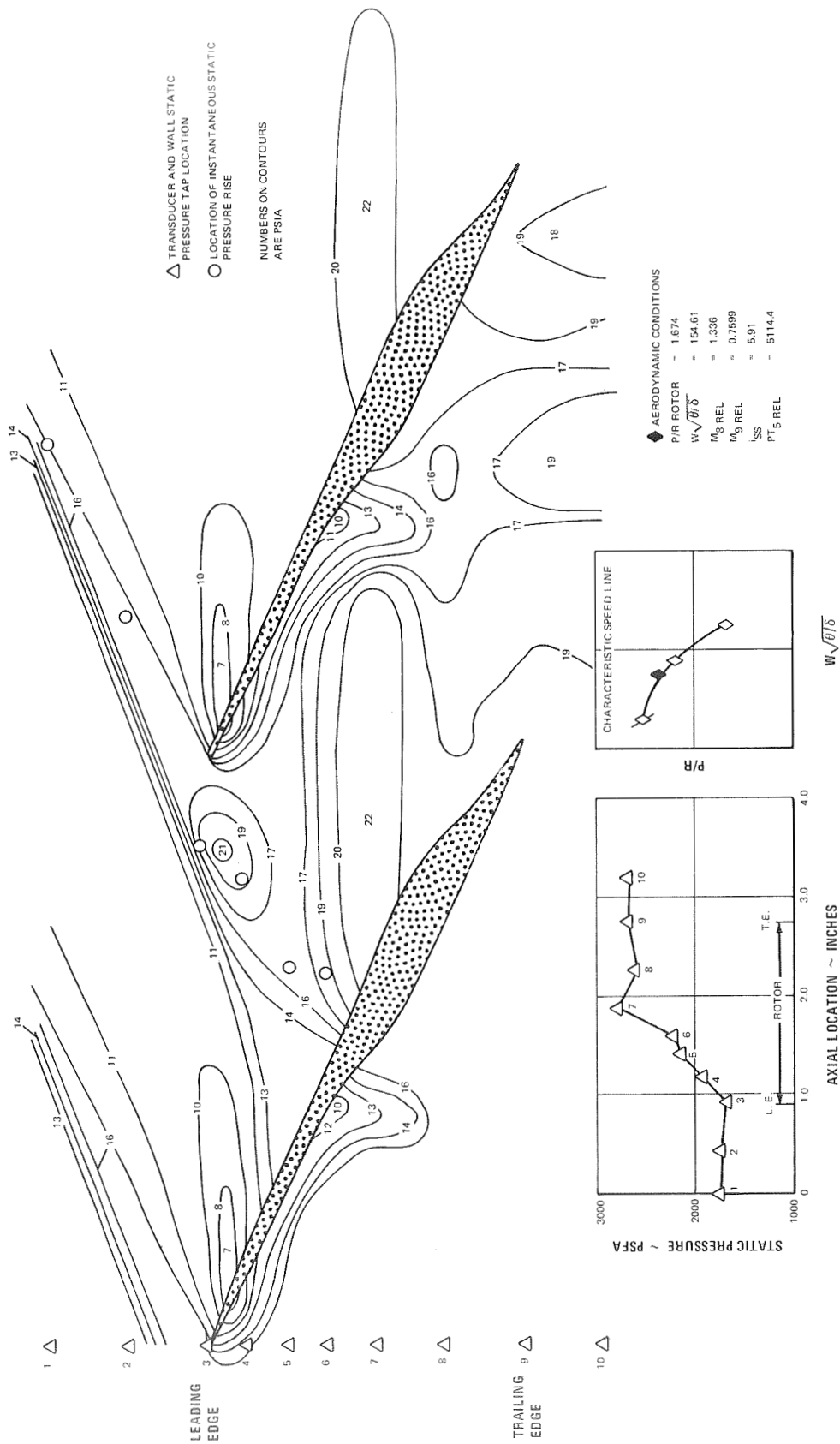


Figure 20c Rotor Blade Tip Static Pressure Contours 88 Percent Speed, Flow Rate 154.61 Pounds Per Second

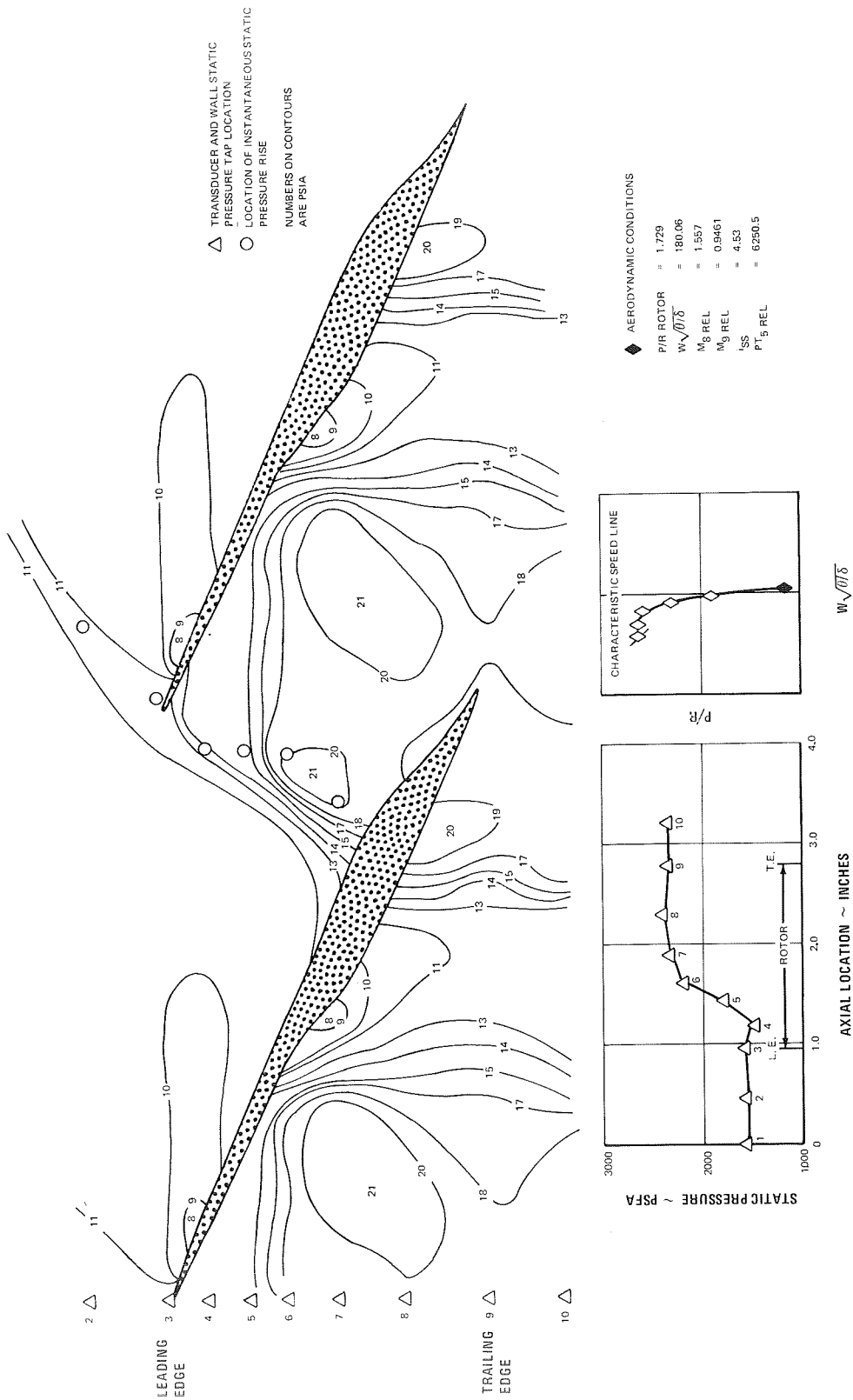
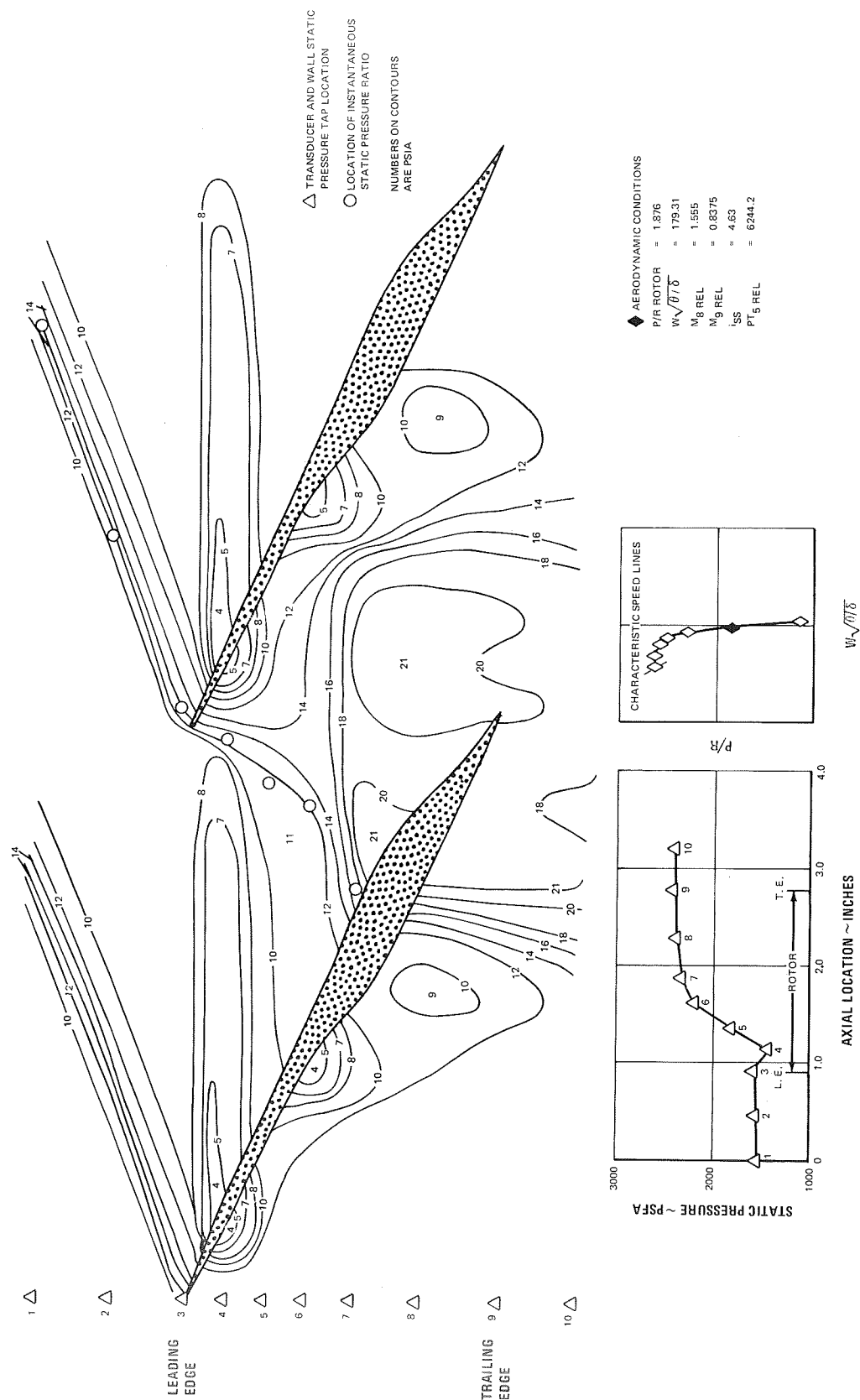


Figure 21a Rotor Blade Tip Static Pressure Contours, 100 Percent Speed, Flow Rate 180.06 Pounds Per Second



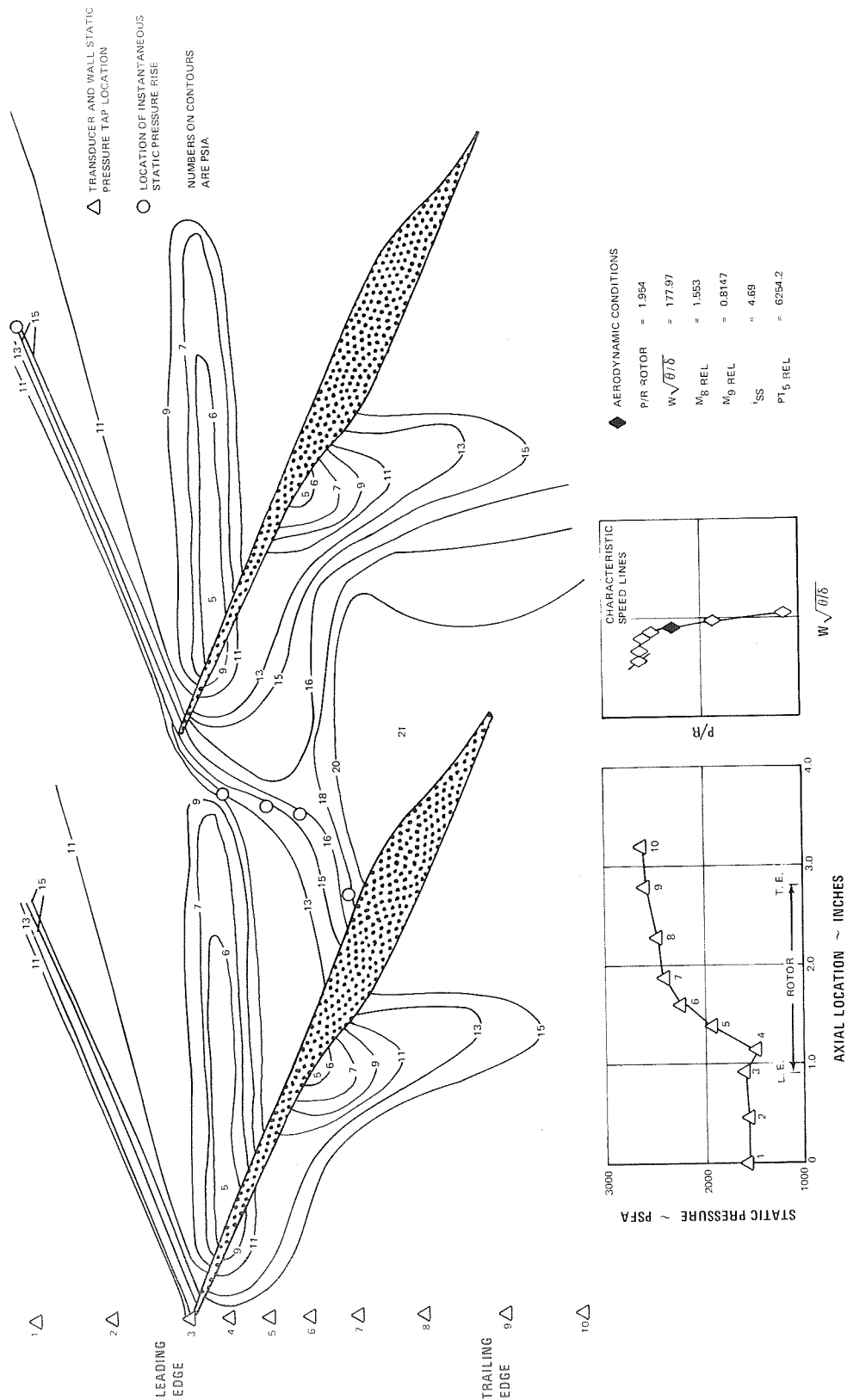


Figure 21c Rotor Blade Tip Static Pressure Contours, 100 Percent Speed, Flow Rate 177.97 Pounds Per Second

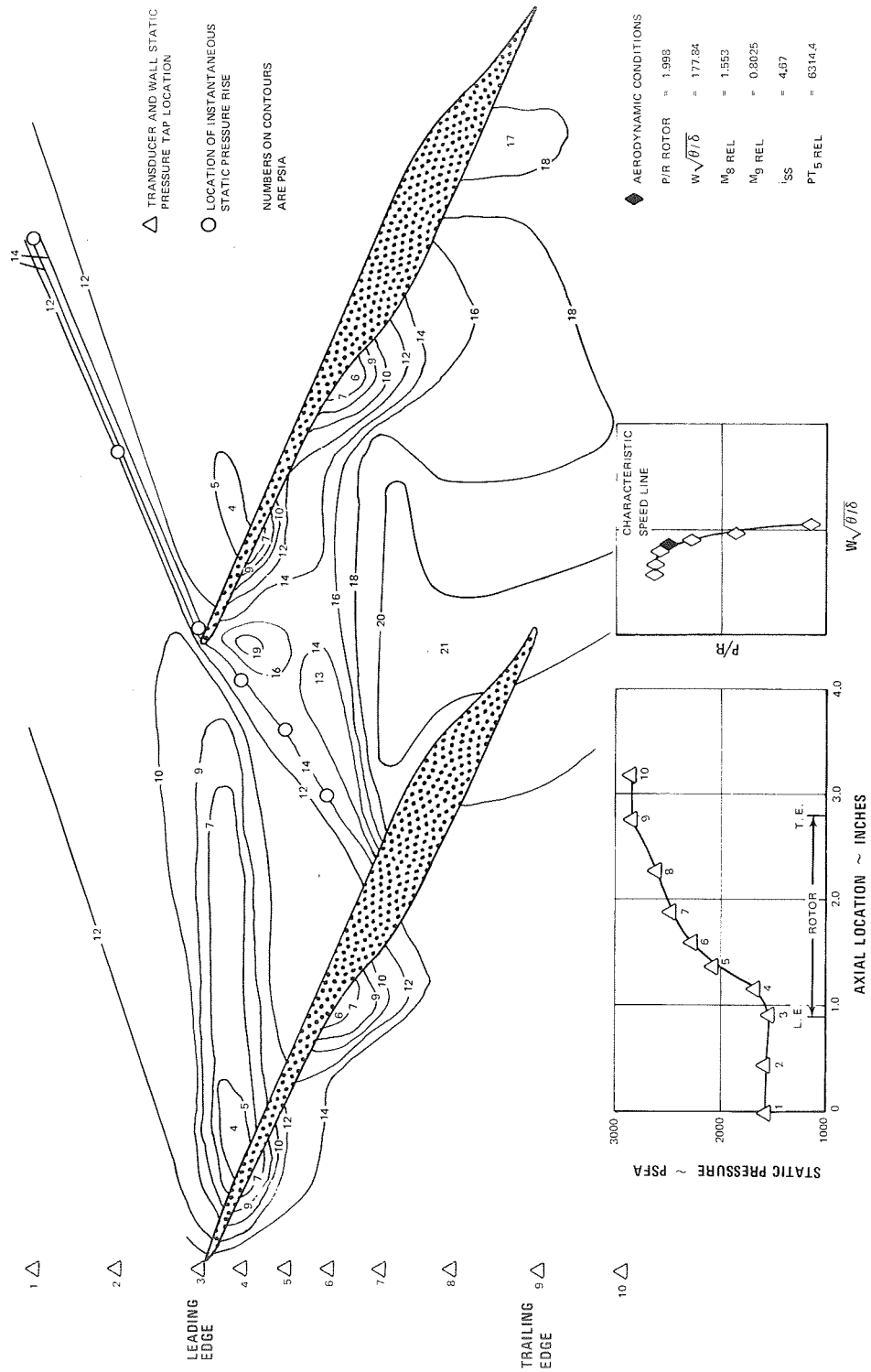
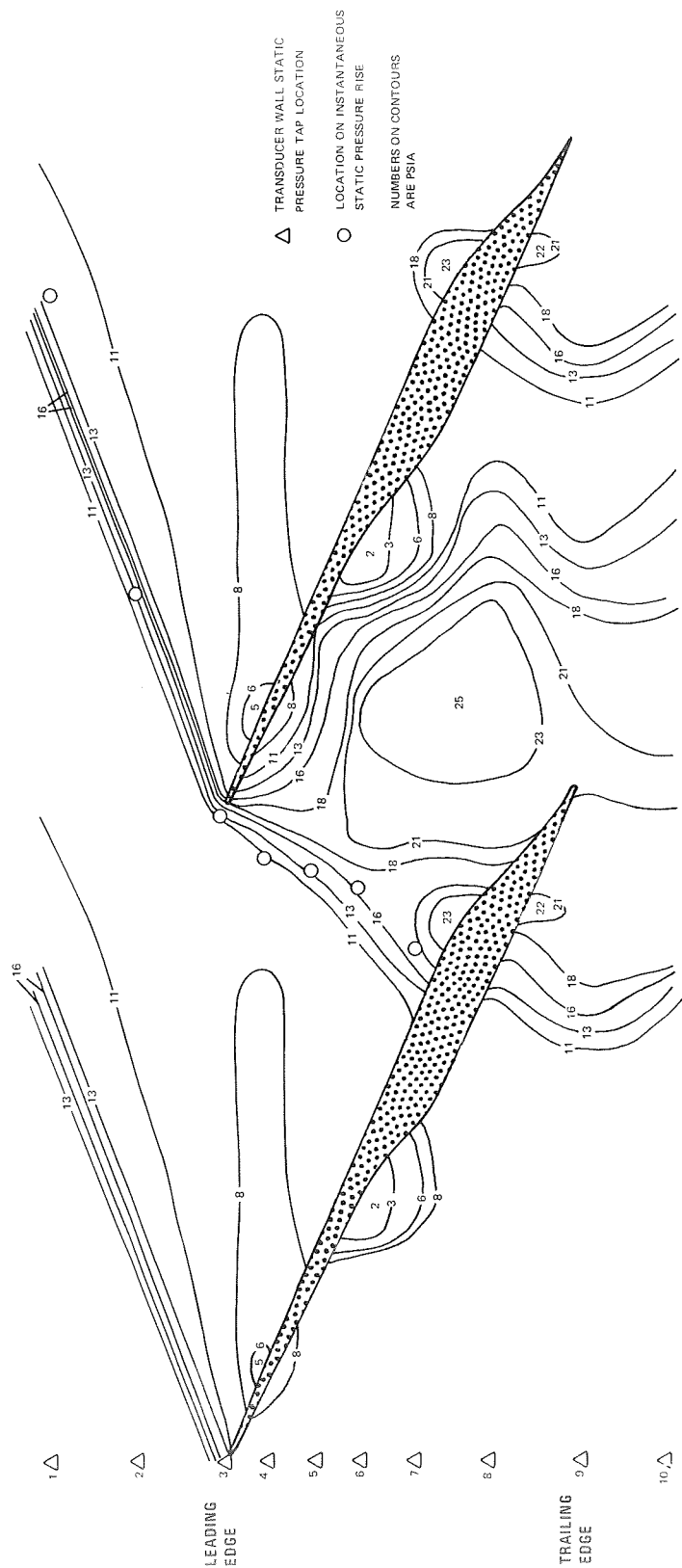


Figure 21d Rotor Blade Tip Static Pressure Contours, 100 Percent Speed, Flow Rate 177.84 Pounds Per Second



\blacklozenge AERODYNAMIC CONDITIONS
 P/R ROTOR = 1.8048
 $W\sqrt{\theta/\delta}$ = 184.86
 M_∞ REL = 1.64
 M_0 REL = 0.971
 ISS = 4.84
 PT_5 REL = 6958.5

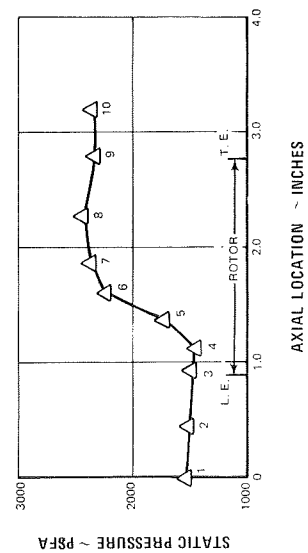
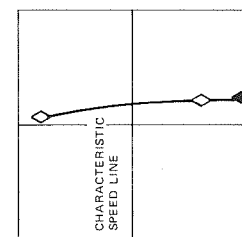


Figure 22a Rotor Blade Tip Static Pressure Contours, 105 Percent Speed, Flow Rate 184.86 Pounds Per Second

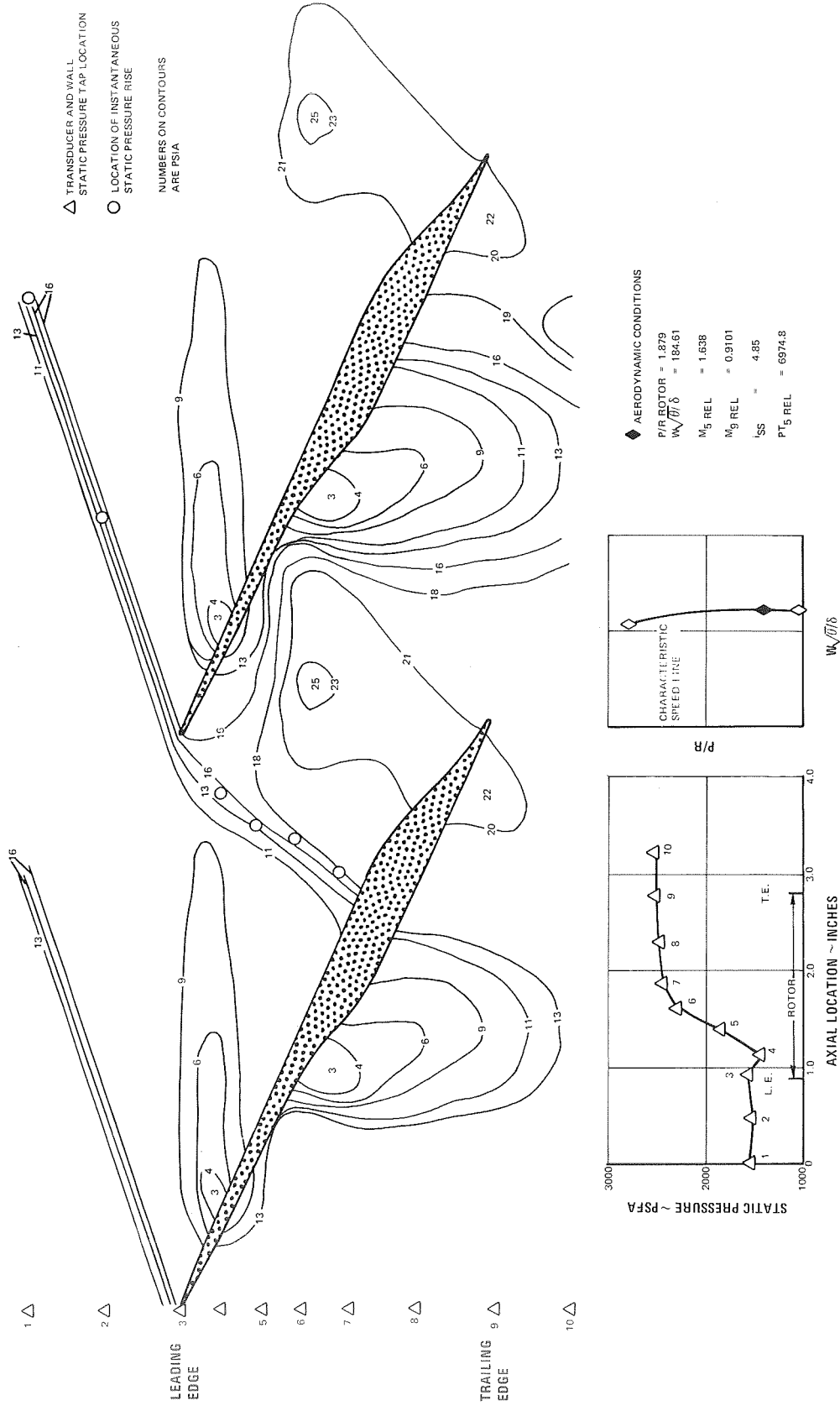


Figure 22b Rotor Blade Tip Static Pressure Contours, 105 Percent Speed, Flow Rate 184.61 Pounds Per Second

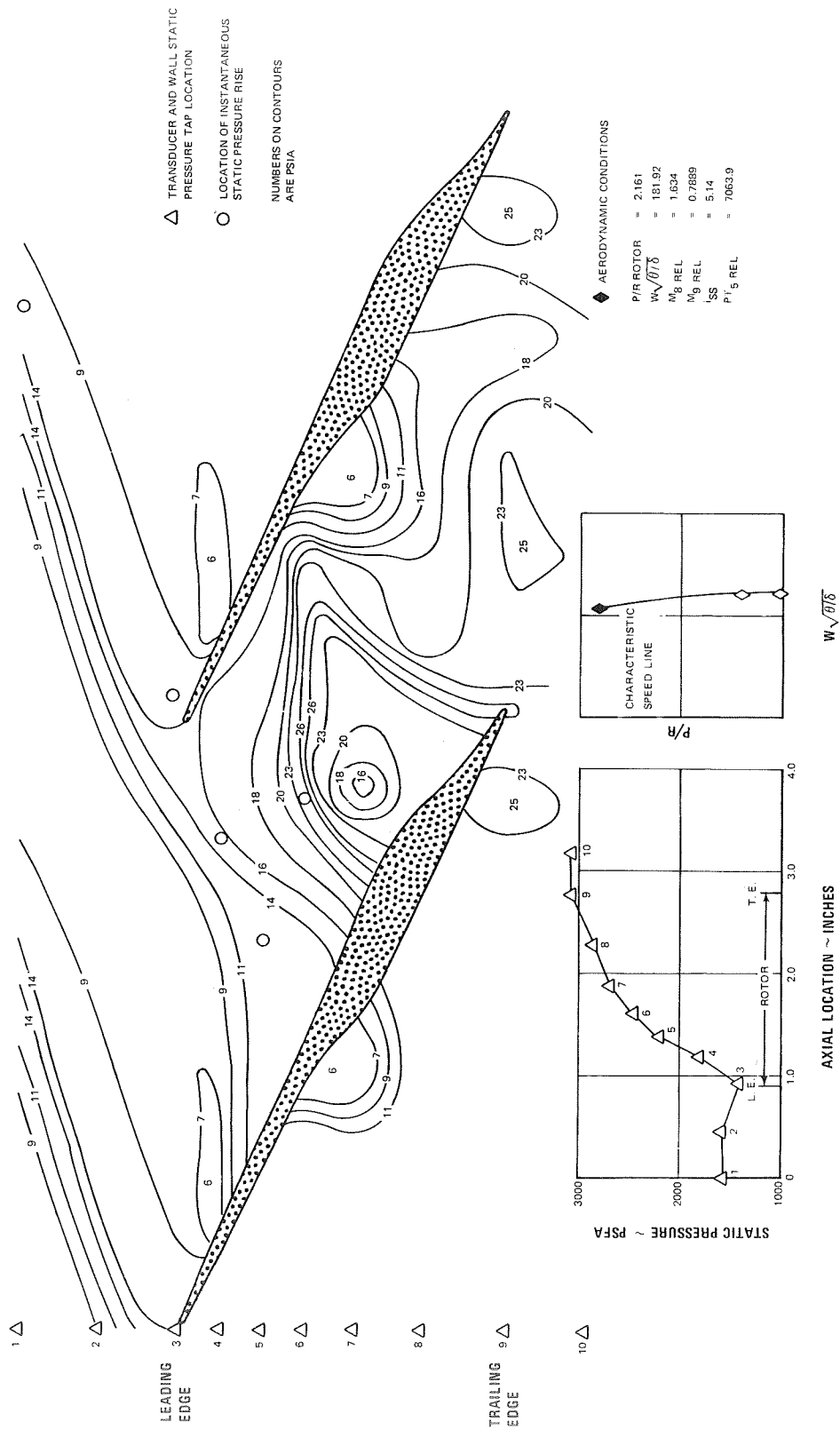


Figure 22c Rotor Blade Tip Static Pressure Contours, 105 Percent Speed, Flow Rate 181.92 Pounds Per Second

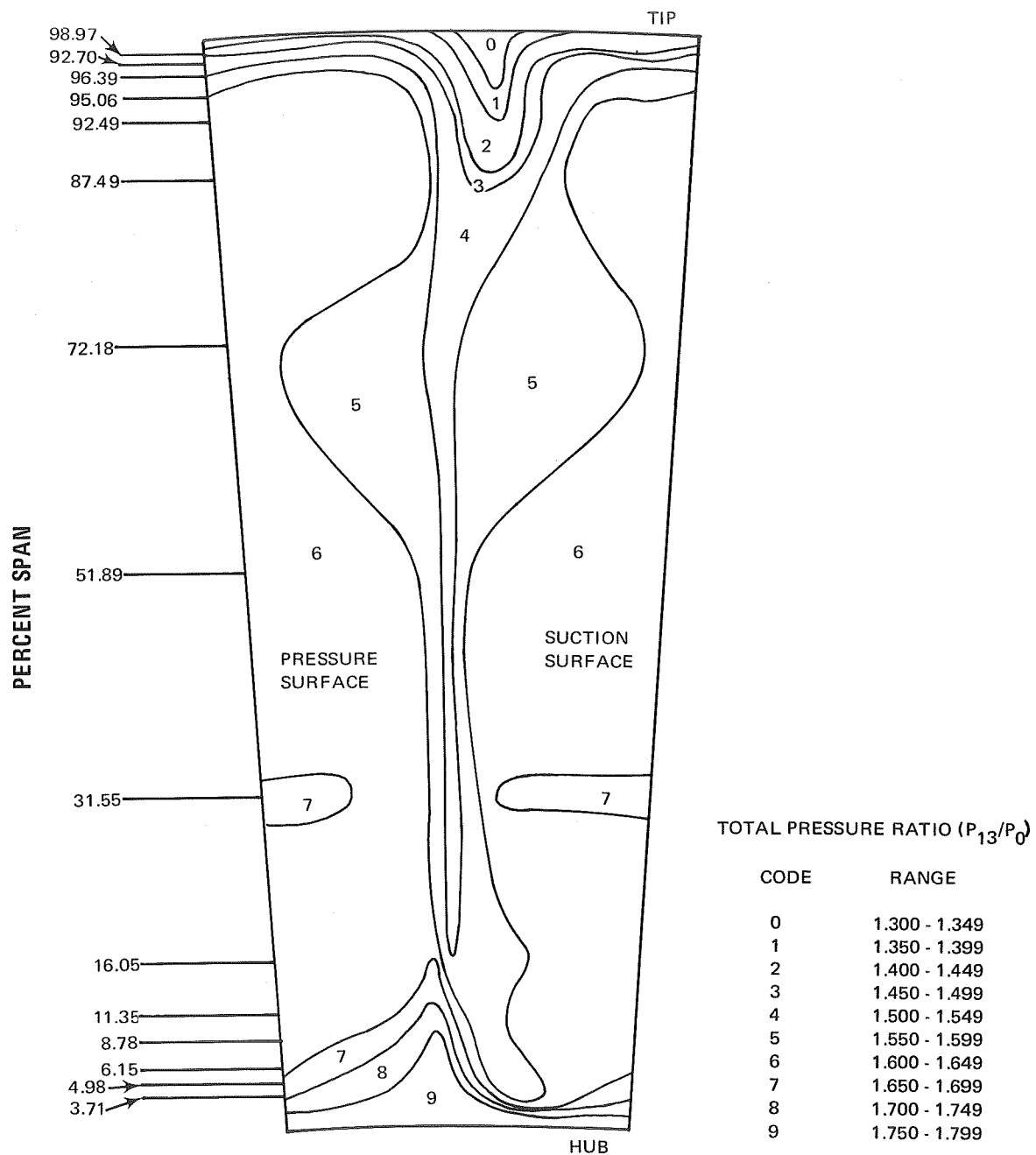


Figure 23a Total Pressure Ratio, 88 Percent Speed 158.05 Pounds Per Second Flow Rate

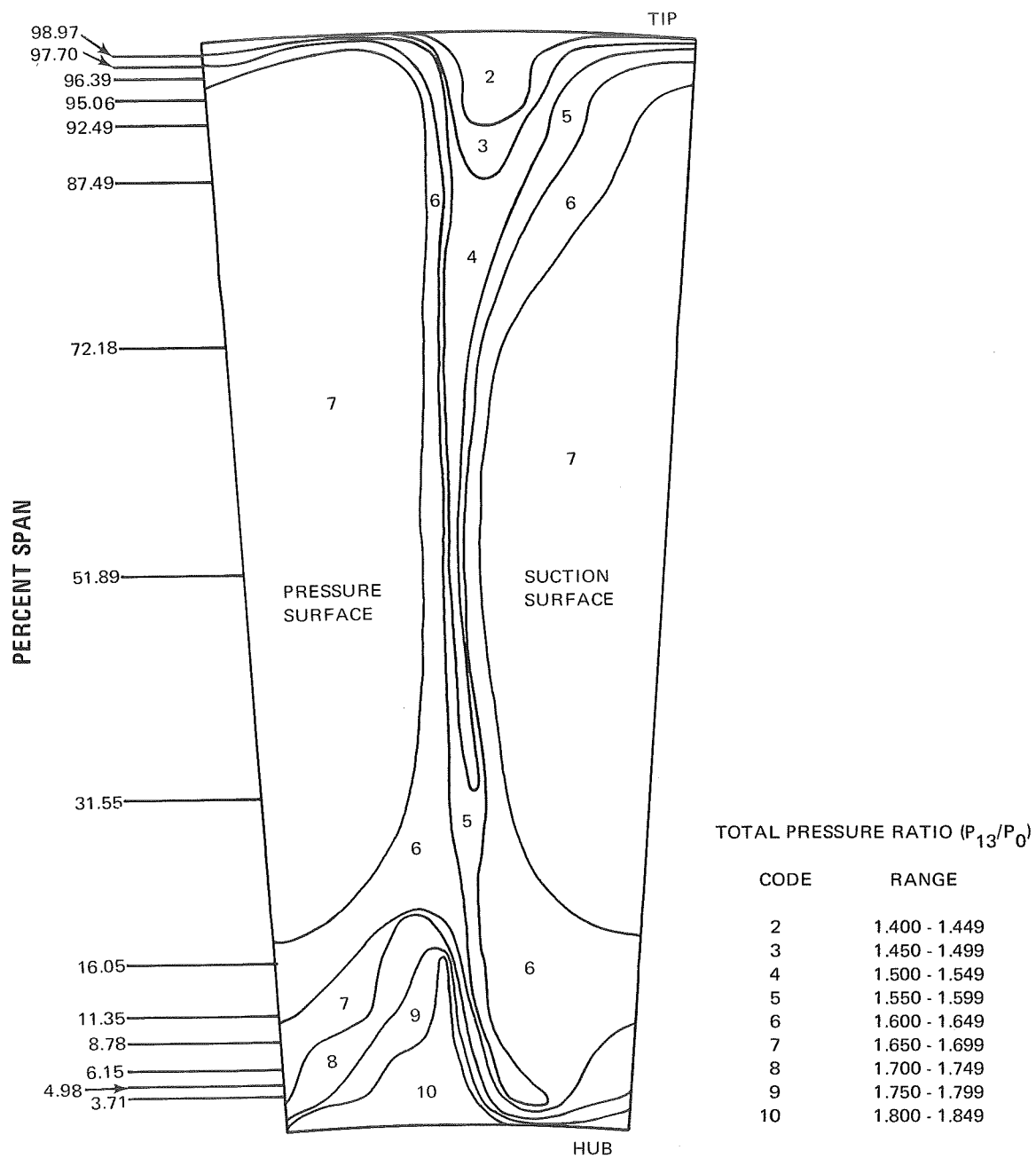


Figure 23b Total Pressure Ratio, 88 Percent Speed, 147.66 Pounds Per Second Flow Rate

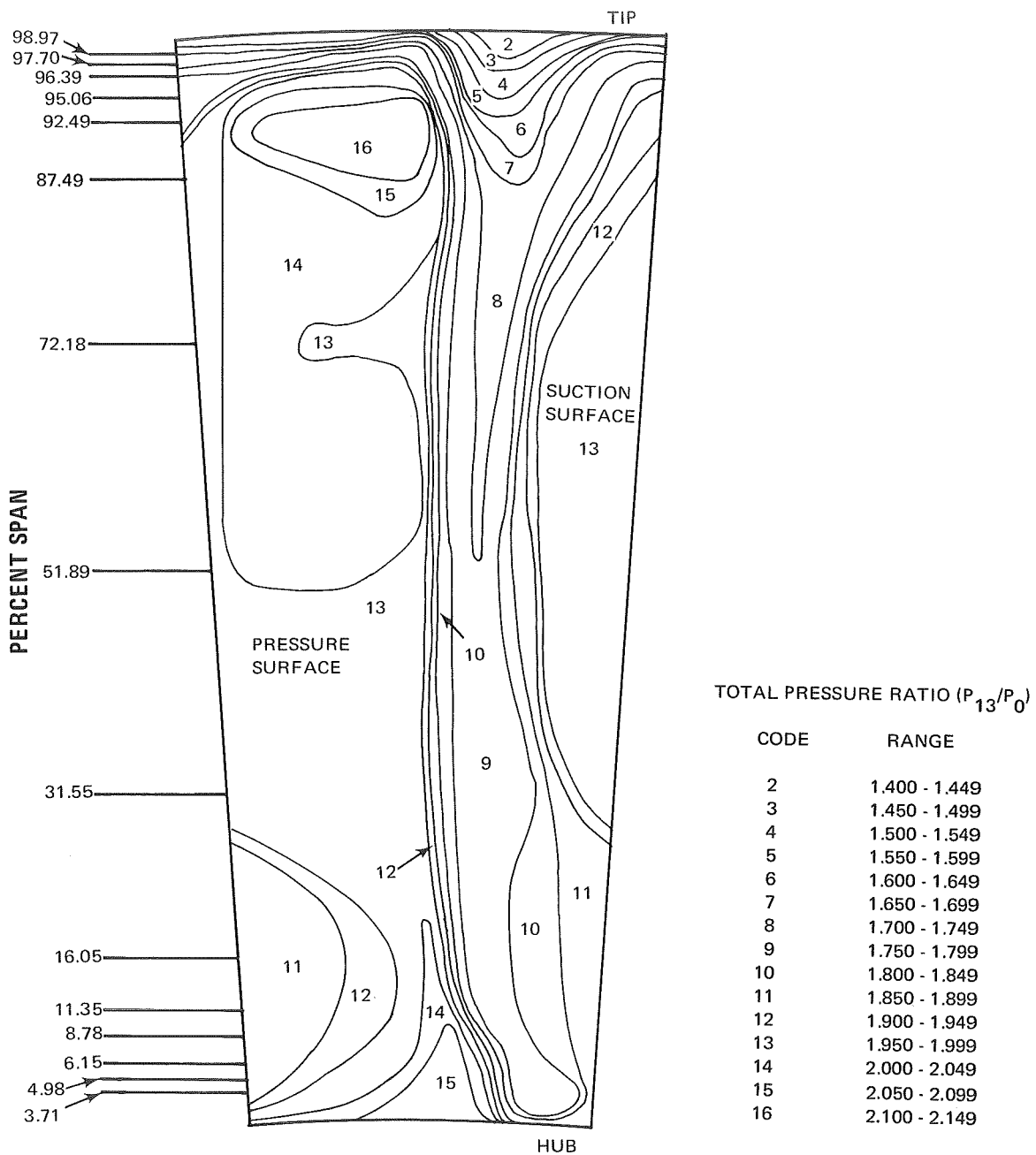


Figure 23c Total Pressure Ratio, 100 Percent Speed, 173.2 Pounds Per Second Flow Rate

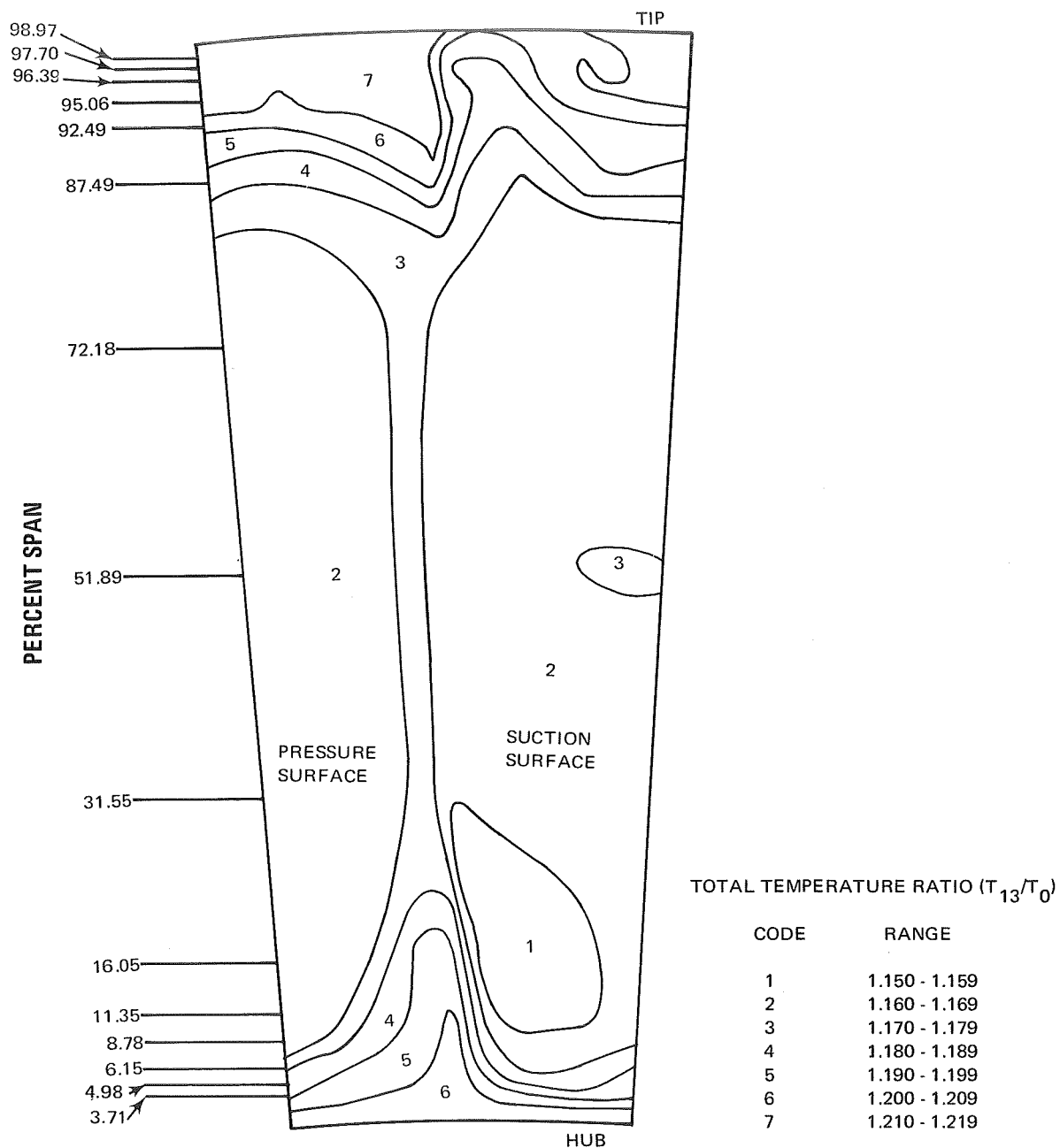


Figure 24a Total Temperature Ratio, 88 Percent Speed, 158.05 Pounds Per Second Flow Rate

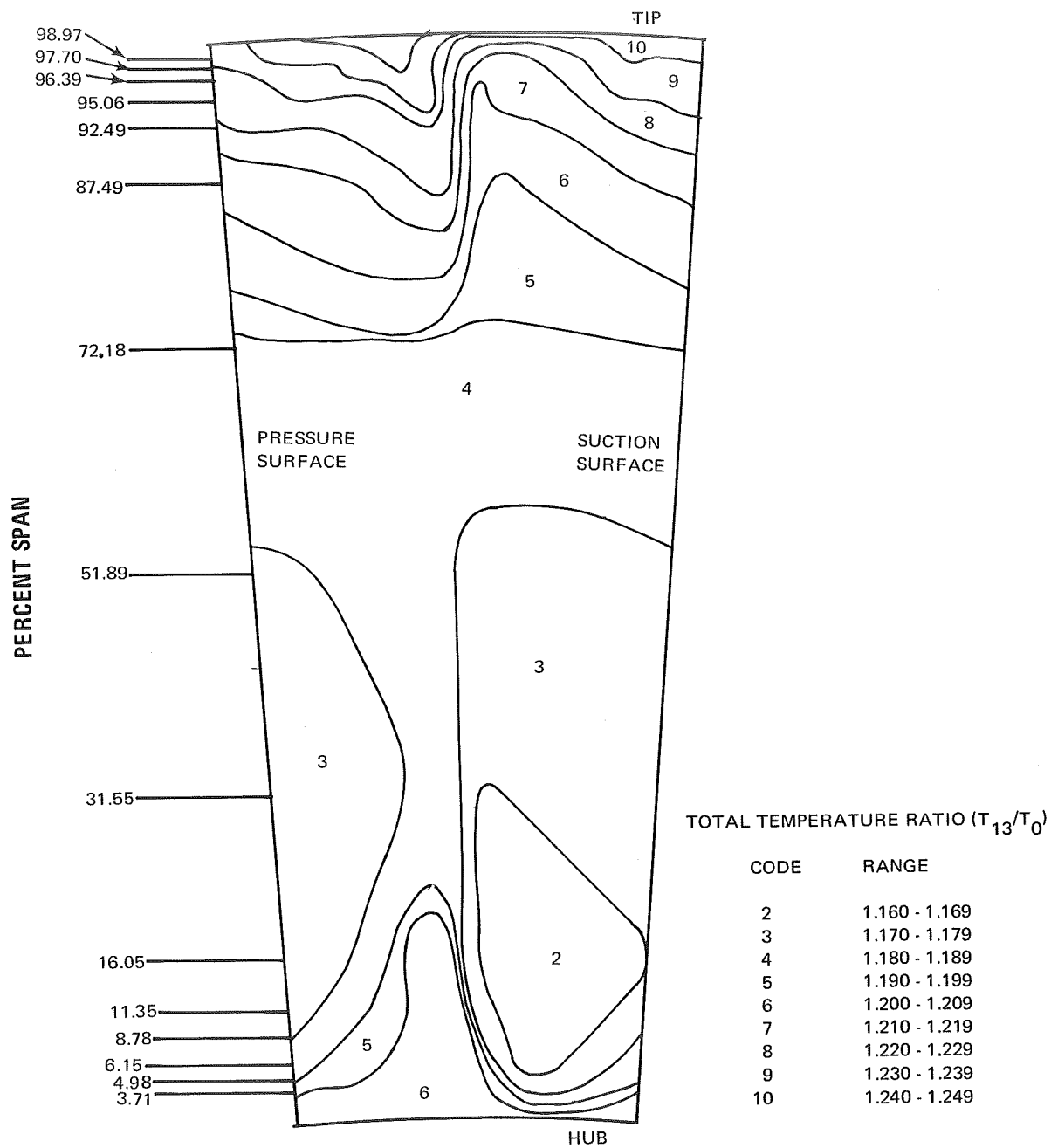


Figure 24b Total Temperature Ratio, 88 Percent Speed, 147.66 Pounds Per Second Flow Rate

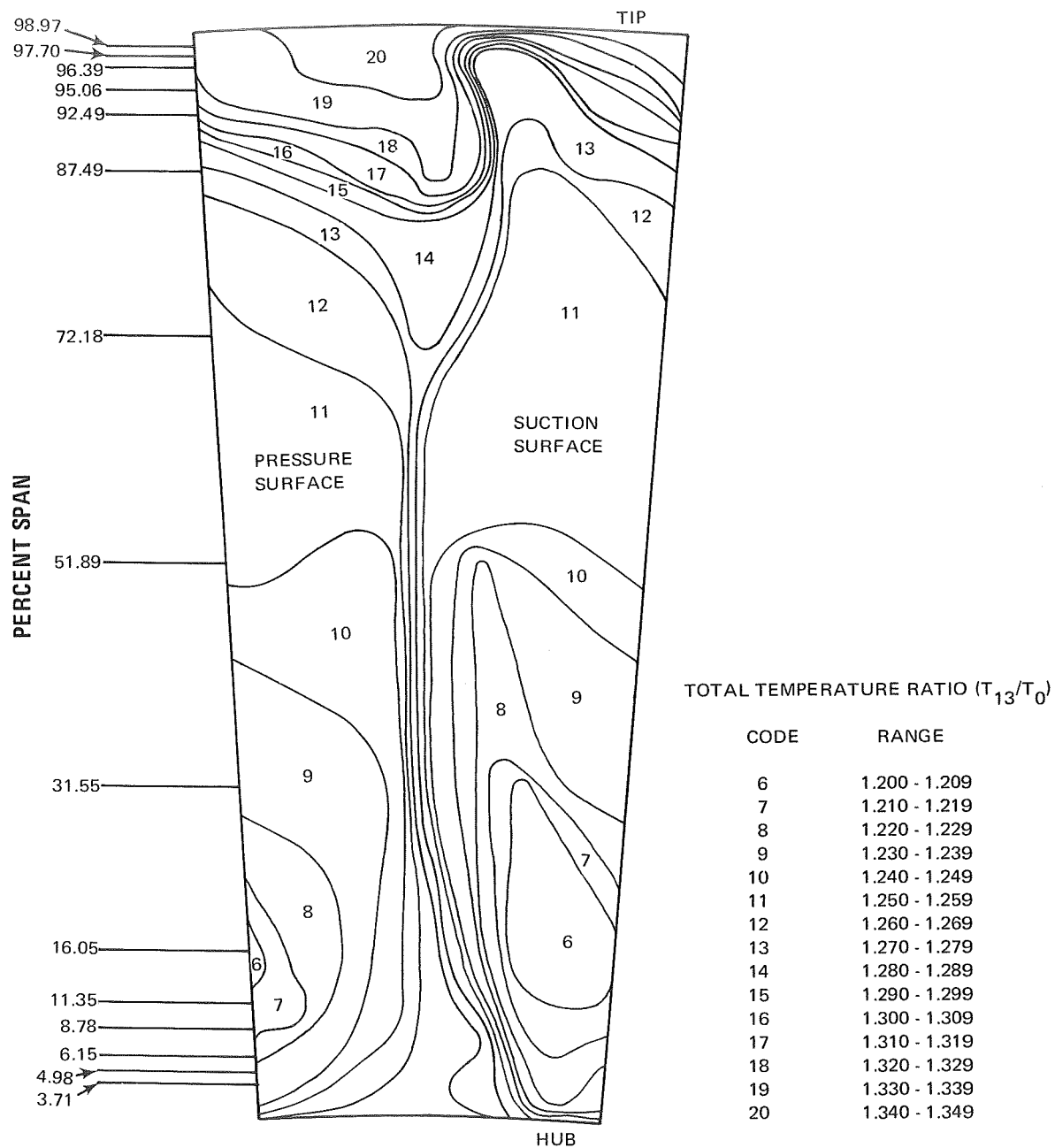


Figure 24c Total Temperature Ratio, 100 Percent Speed, 173.2 Pounds Per Second Flow Rate

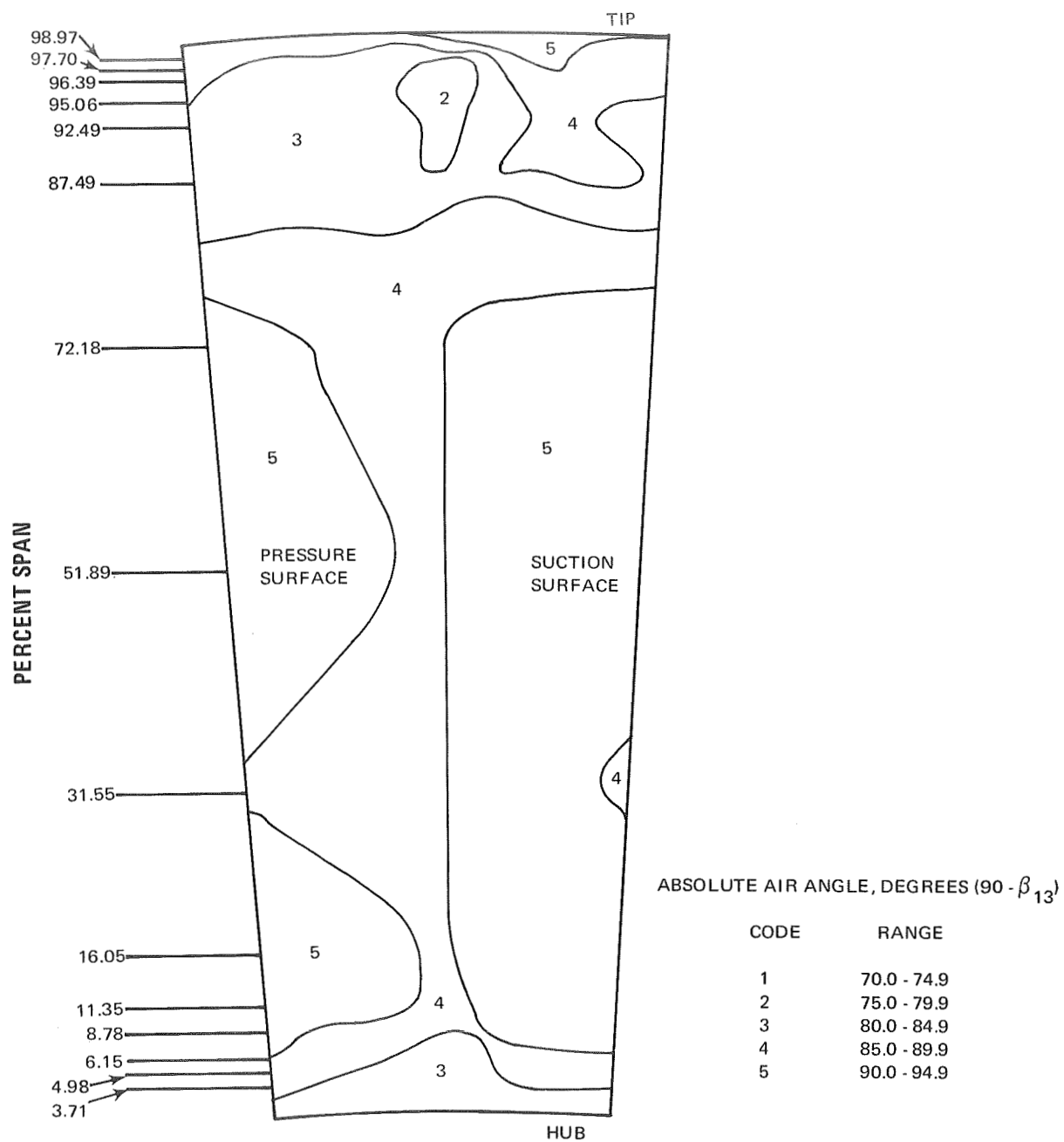


Figure 25a Absolute Air Angle, 88 Percent Speed, 158.05 Pounds Per Second Flow Rate

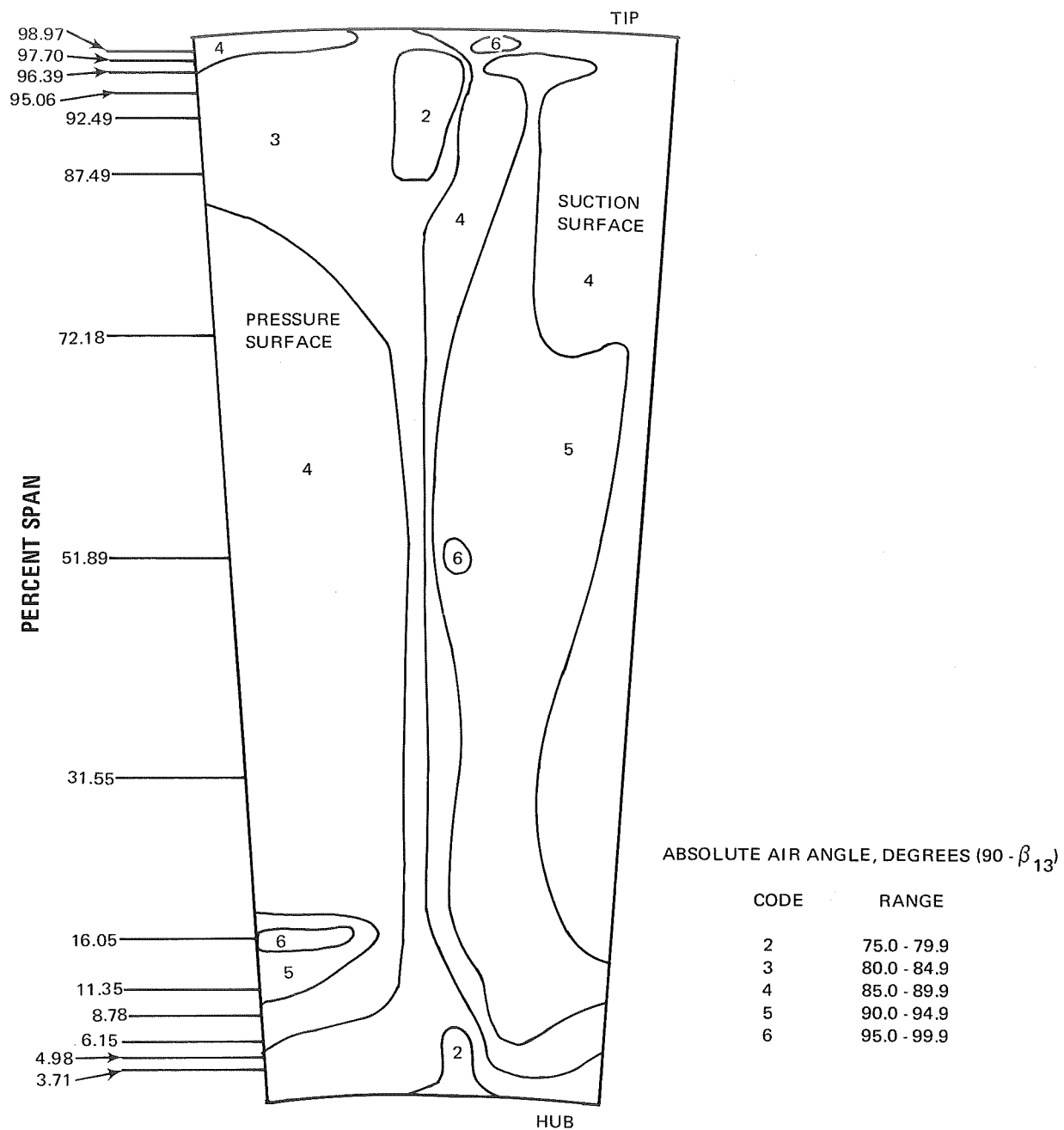


Figure 25b Absolute Air Angle, 88 Percent Speed, 147.66 Pounds Per Second Flow Rate

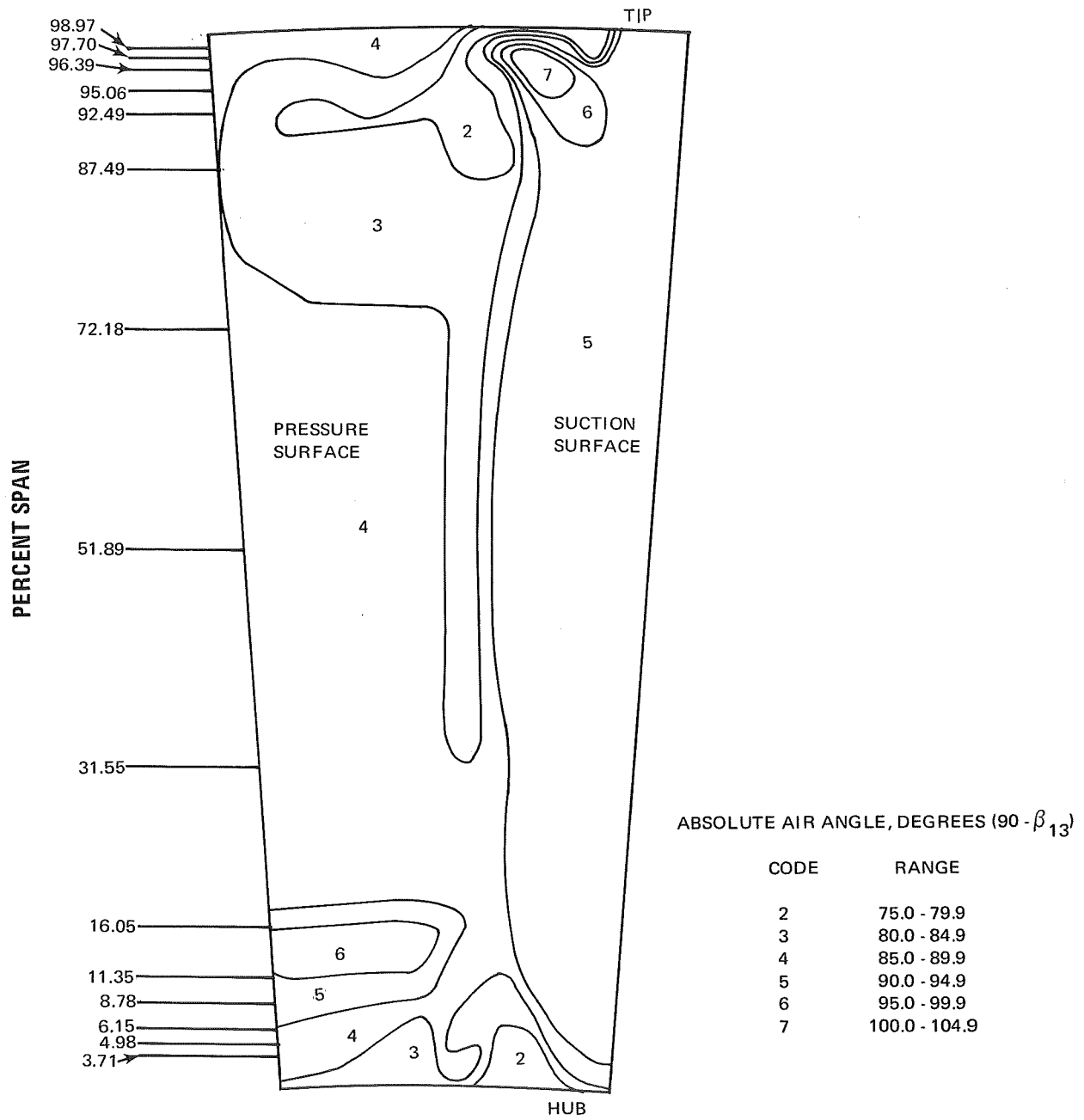


Figure 25c Absolute Air Angle, 100 Percent Speed, 173.2 Pounds Per Second Flow Rate

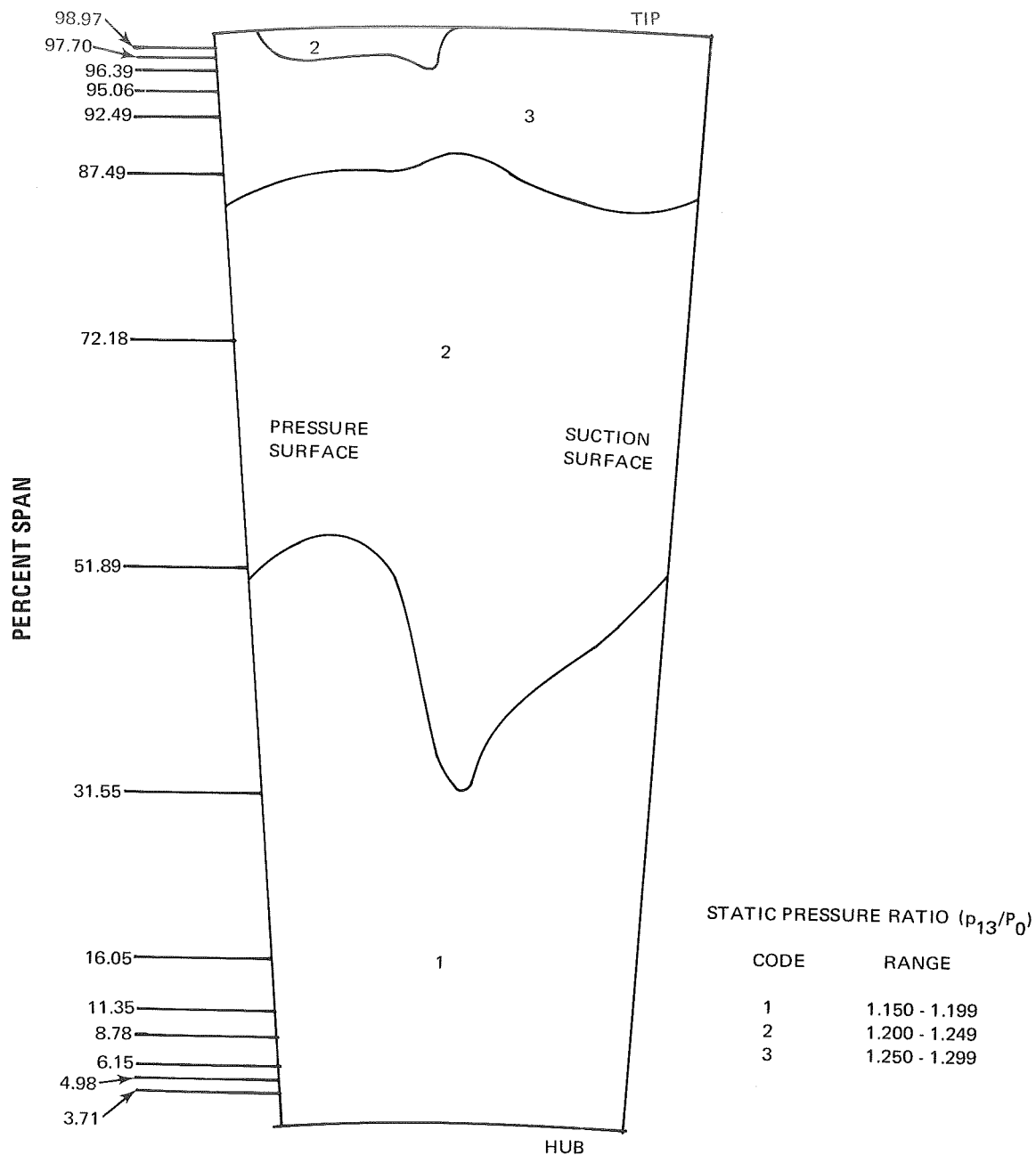


Figure 26a Static Pressure Ratio, 88 Percent Speed, 158.05 Pounds Per Second Flow Rate

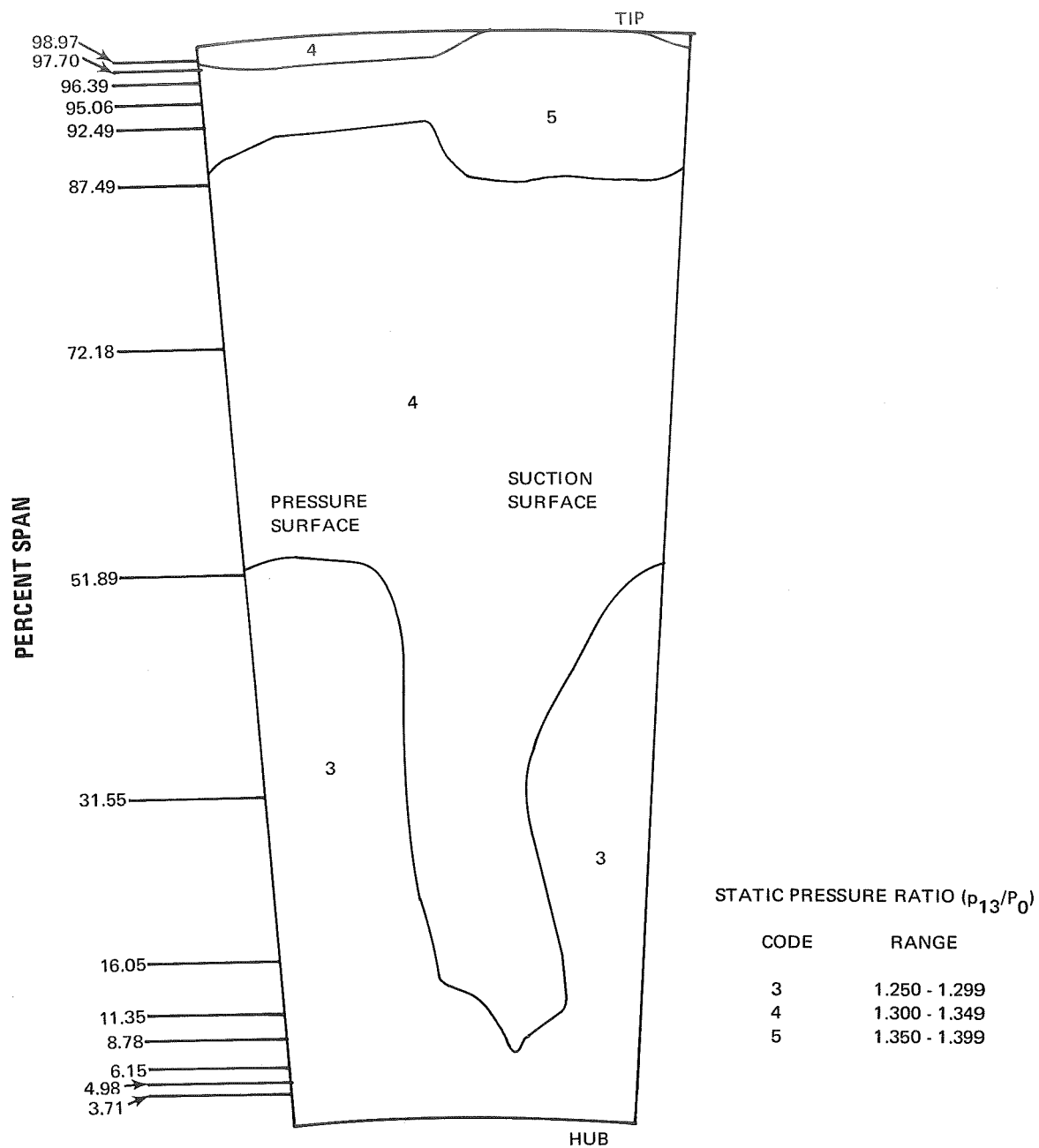


Figure 26b Static Pressure Ratio, 88 Percent Speed, 147.66 Pounds Per Second Flow Rate

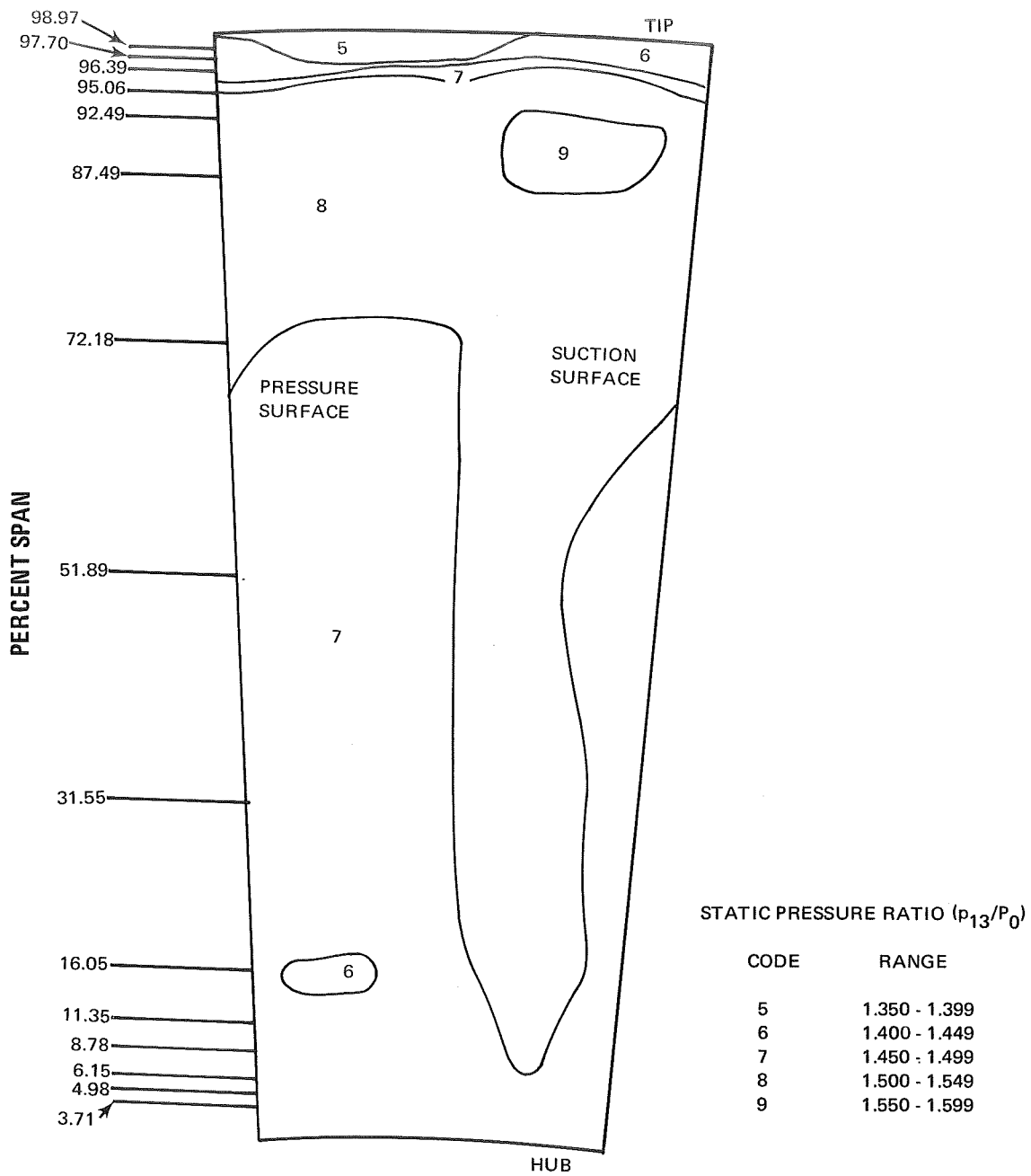


Figure 26c Static Pressure Ratio, 100 Percent Speed, 173.2 Pounds Per Second Flow Rate

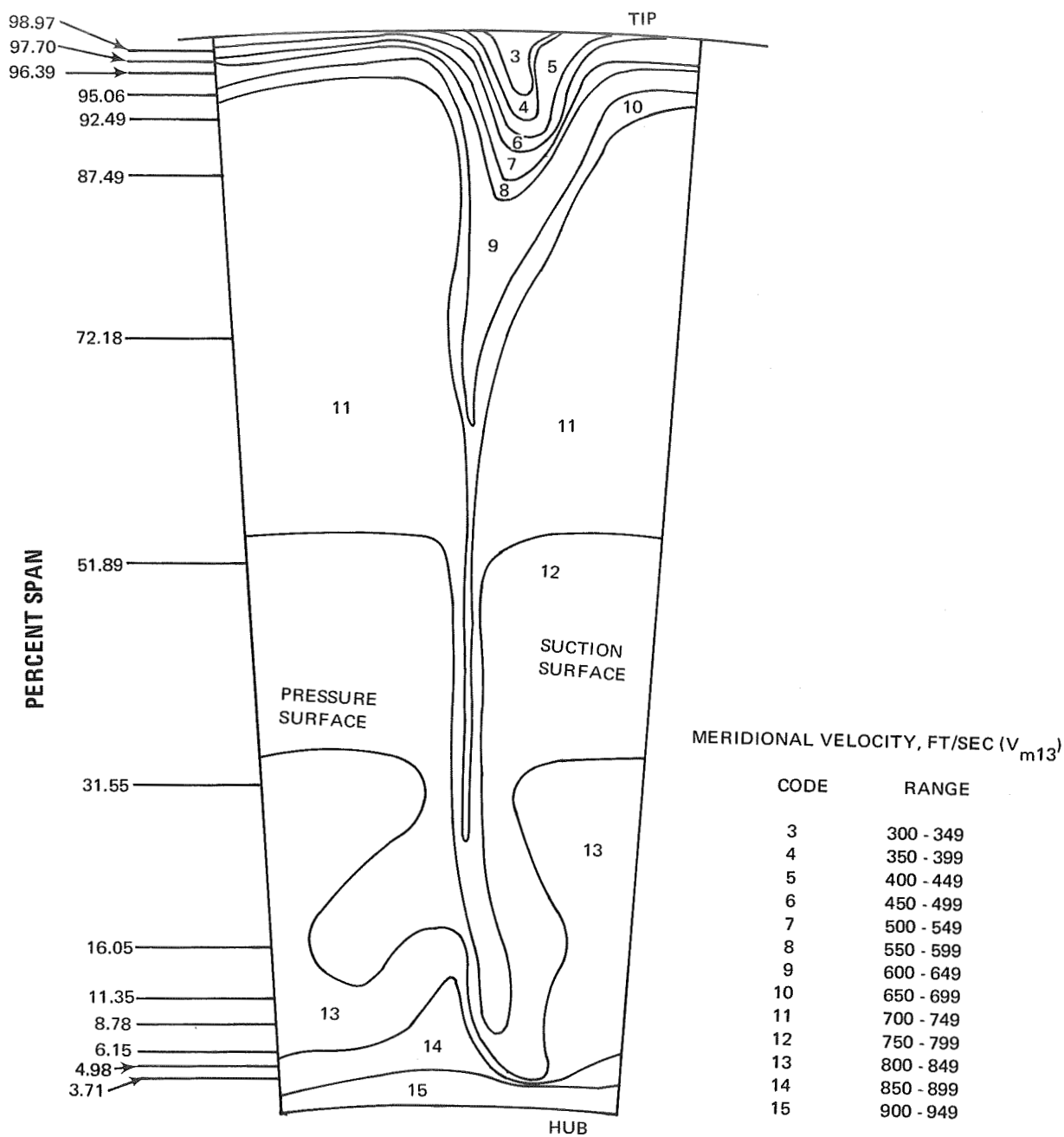


Figure 27a Meridional Velocity, 88 Percent Speed, 158.05 Pounds Per Second Flow Rate

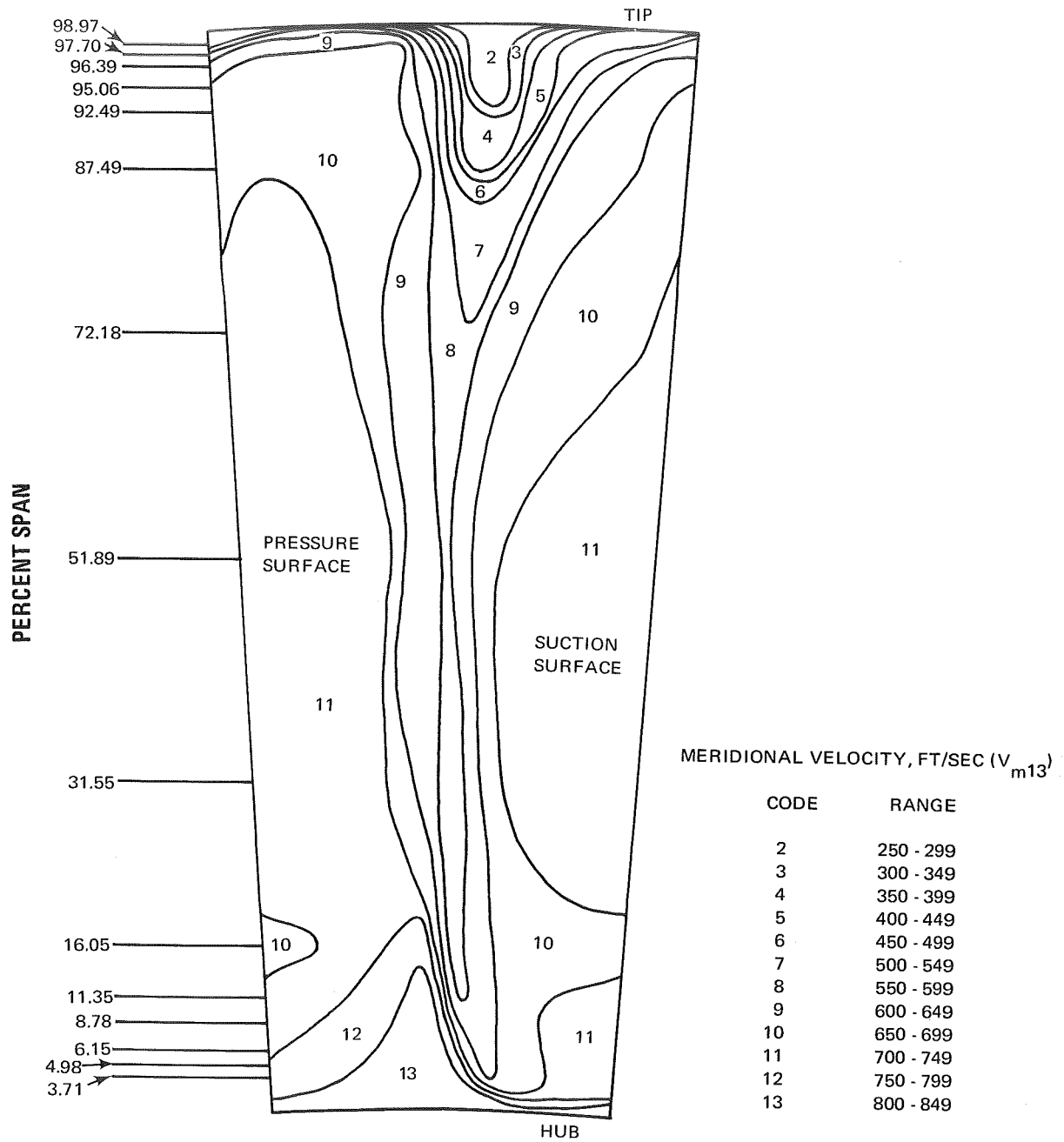


Figure 27b Meridional Velocity, 88 Percent Speed, 147.66 Pounds Per Second Flow Rate

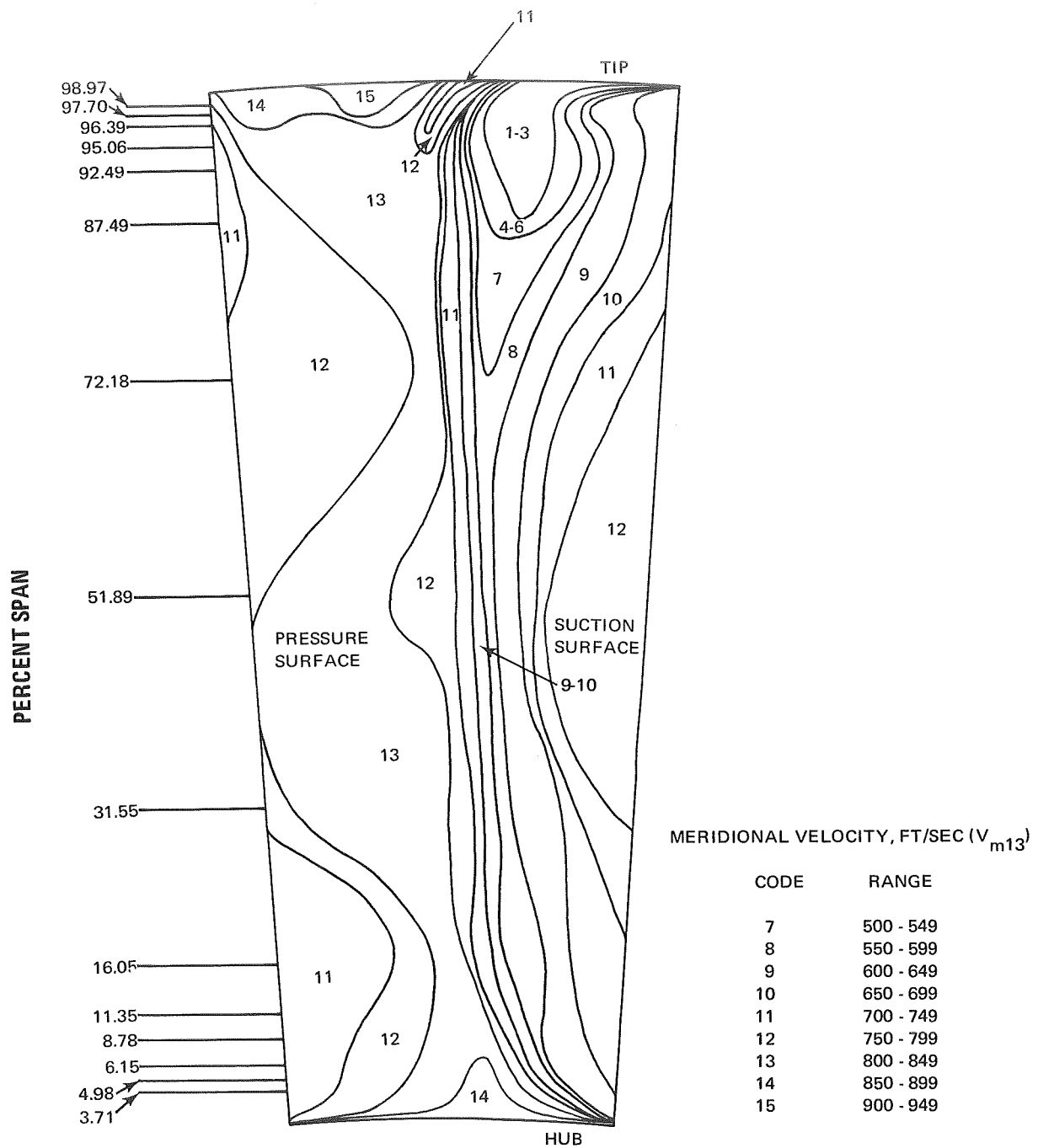


Figure 27c Meridional Velocity, 100 Percent Speed, 173.2 Pounds Per Second Flow Rate

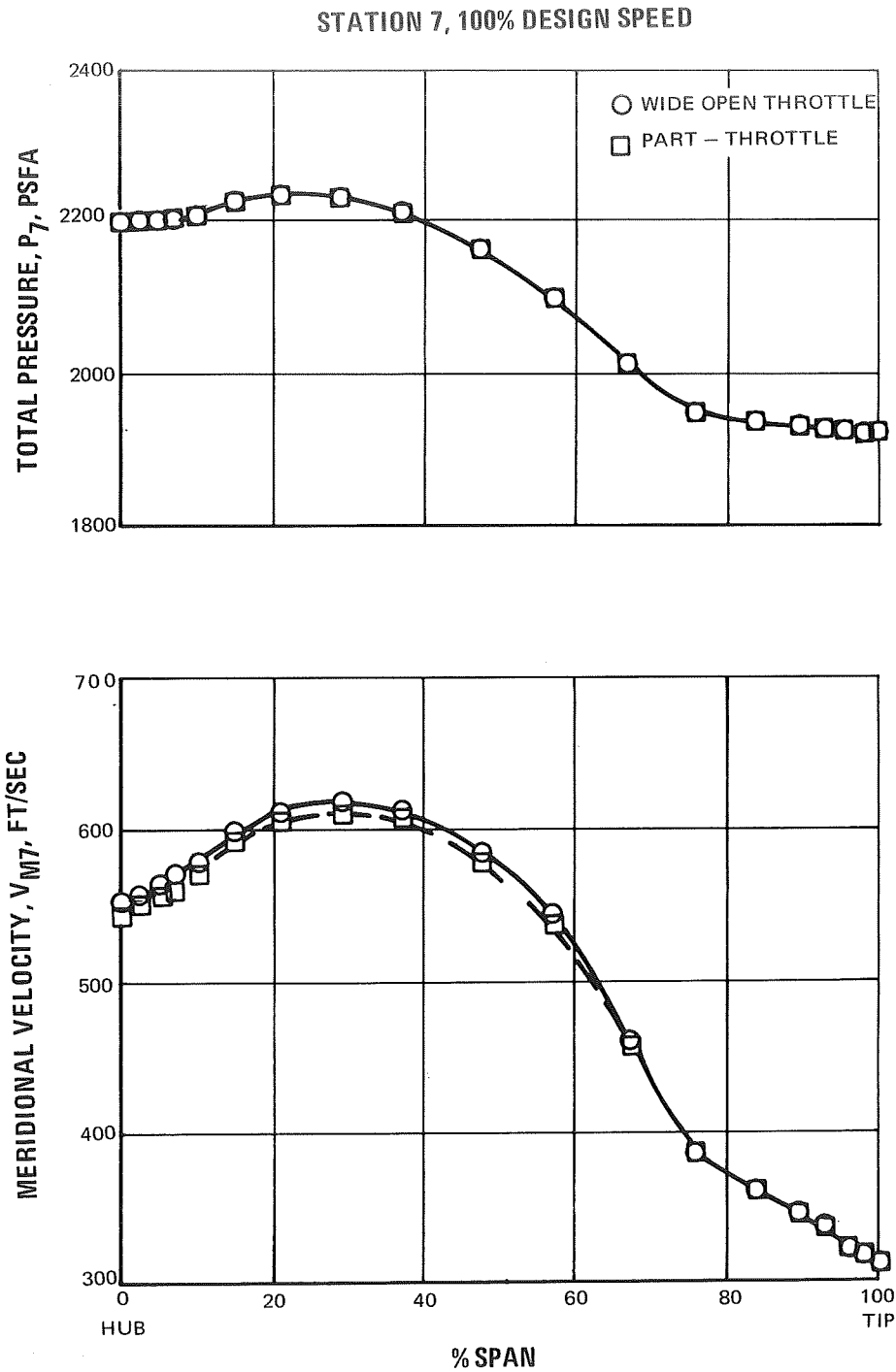


Figure 28 Spanwise Variation of Rotor Inlet Total Pressure and Meridional Velocity With Radially Distorted Inlet Flow

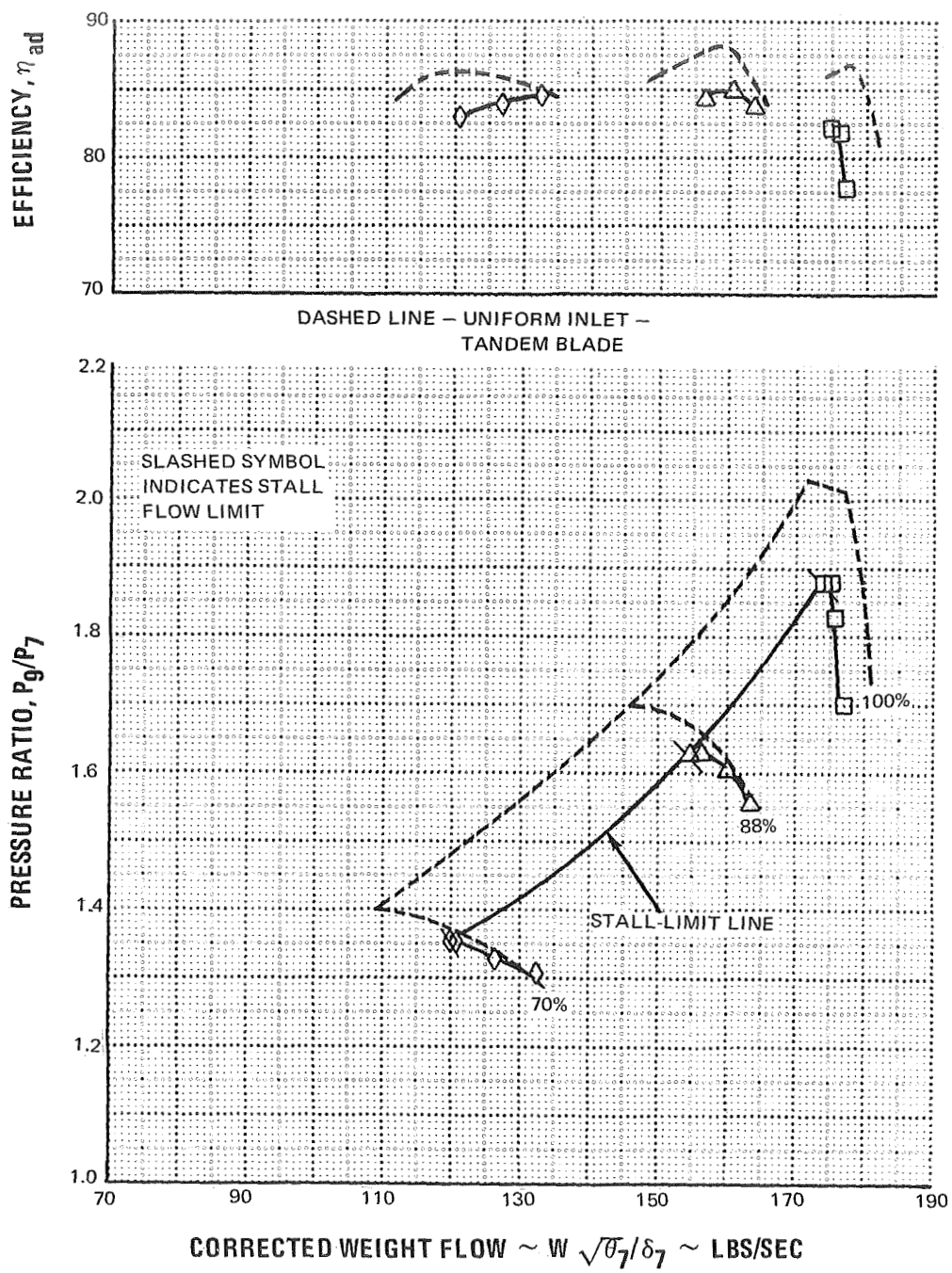


Figure 29 Rotor Overall Performance With Radially Distorted Inlet Flow

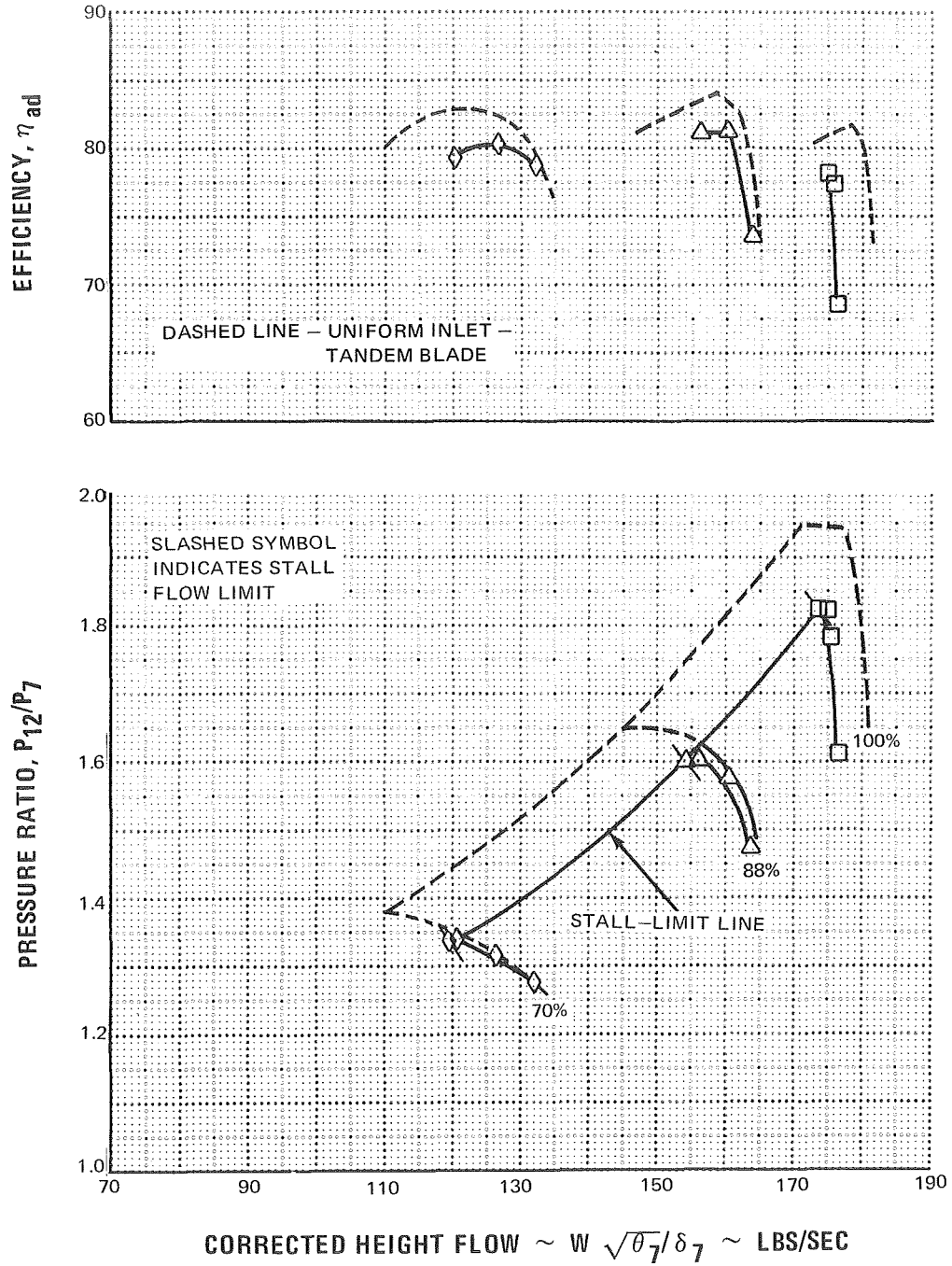


Figure 30 Stage Overall Performance With Radially Distorted Inlet Flow

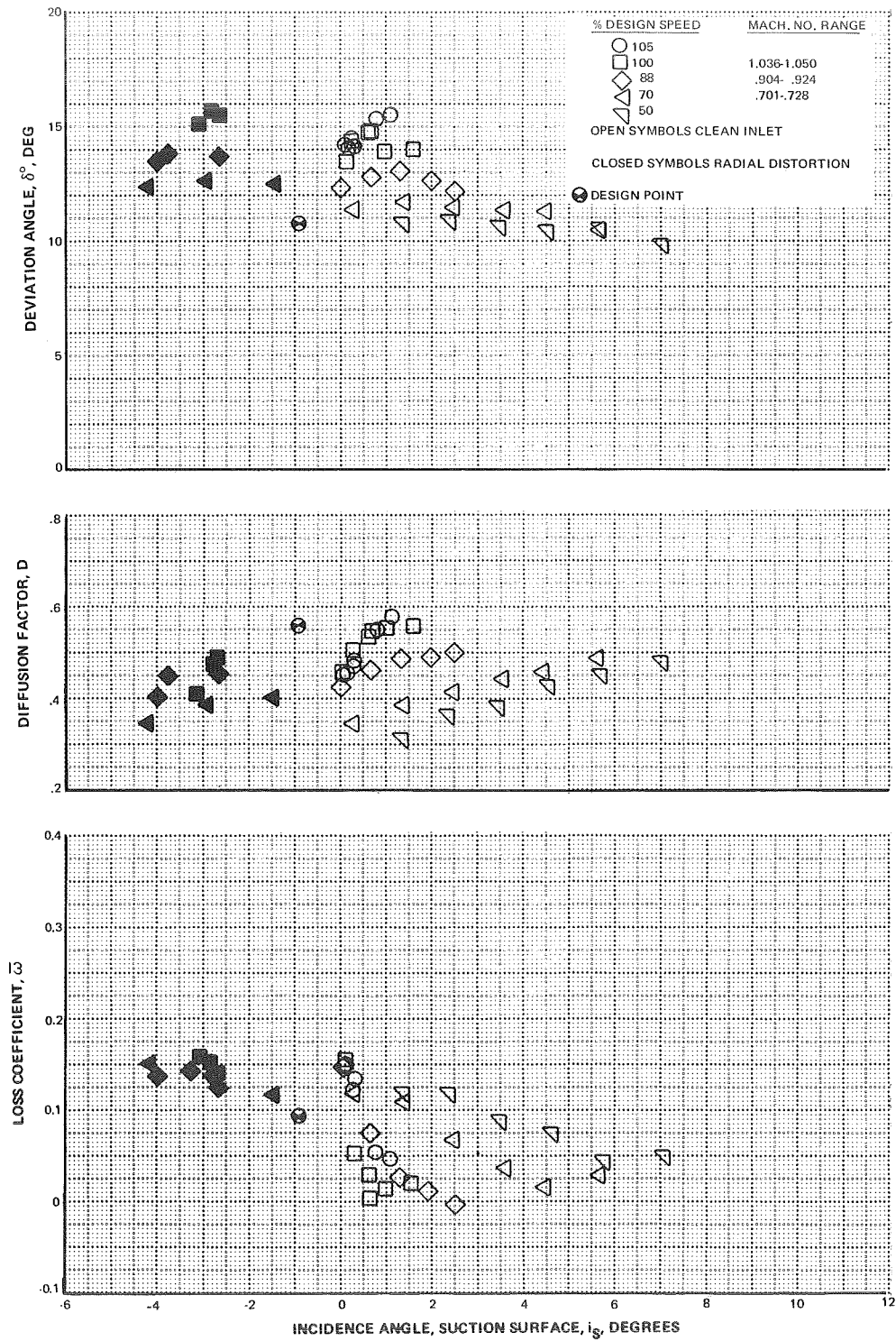


Figure 31a Rotor Blade Element Performance With Radially Distorted Inlet Flow, 10 Percent Span From Hub

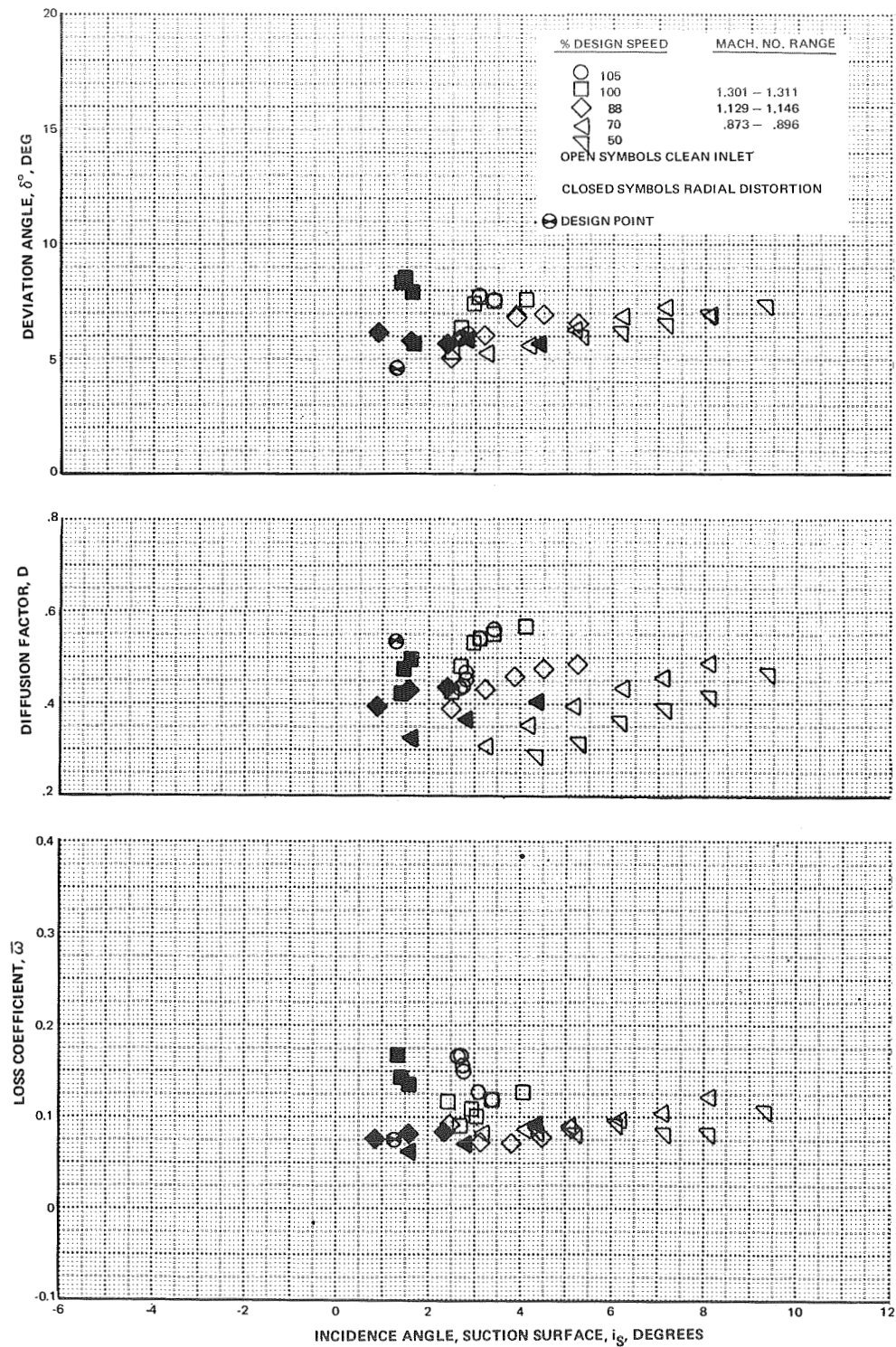


Figure 31b Rotor Blade Element Performance With Radially Distorted Inlet Flow, 50 Percent Span From Hub

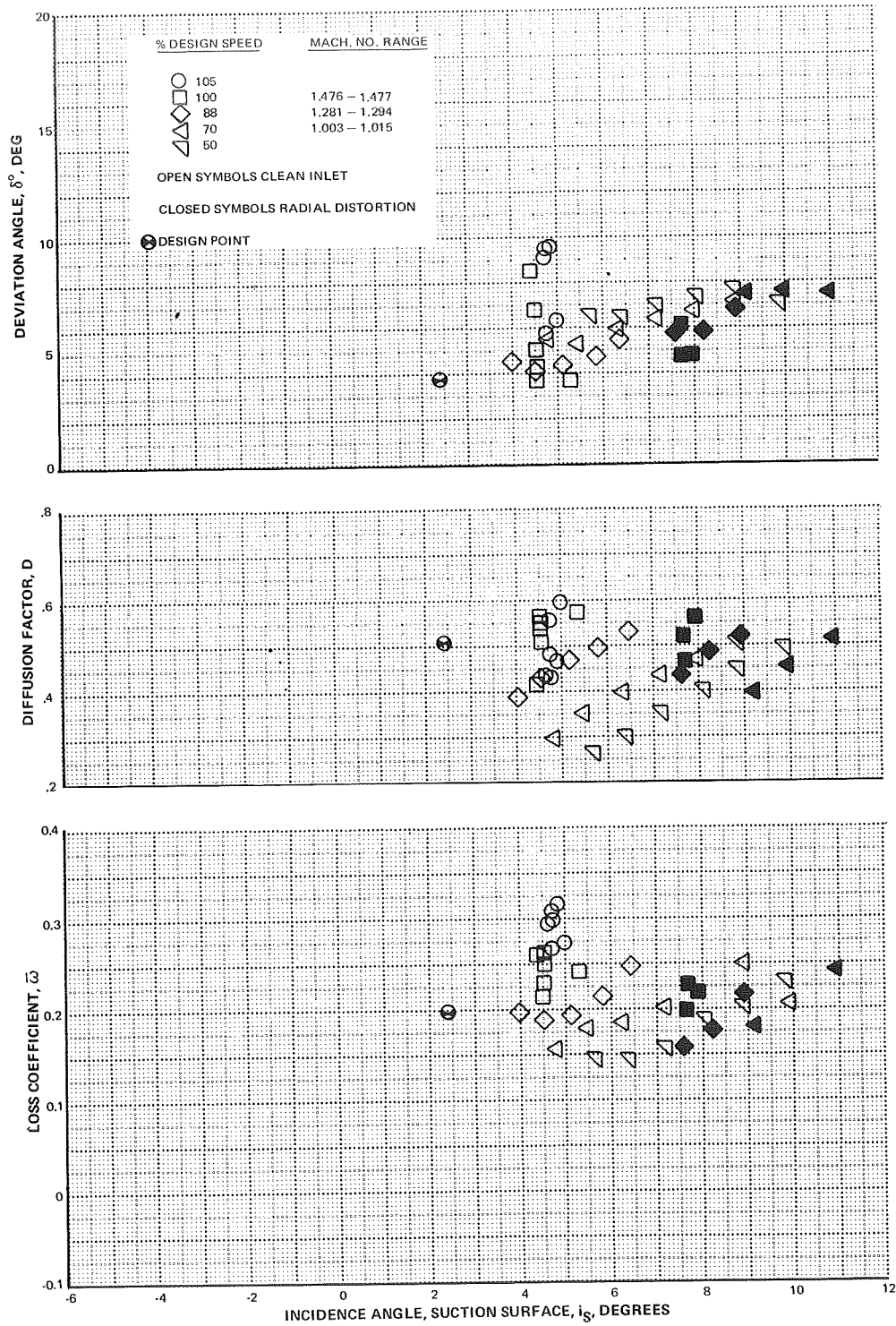


Figure 31c Rotor Blade Element Performance With Radially Distorted Inlet Flow, 90 Percent Span From Hub

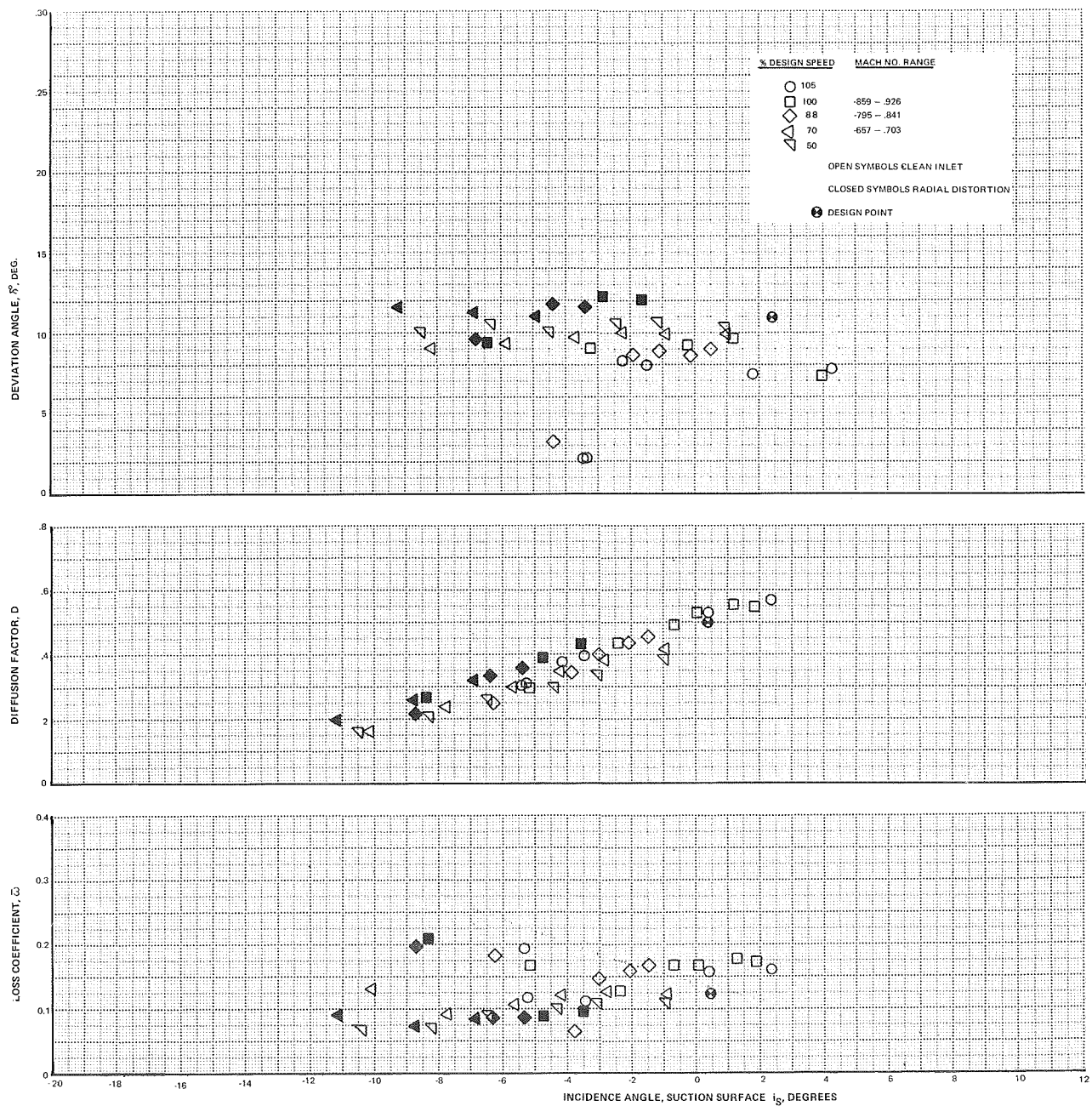


Figure 32a Stator Blade Element Performance With Radially Distorted Inlet Flow, 10 Percent Span Form Hub

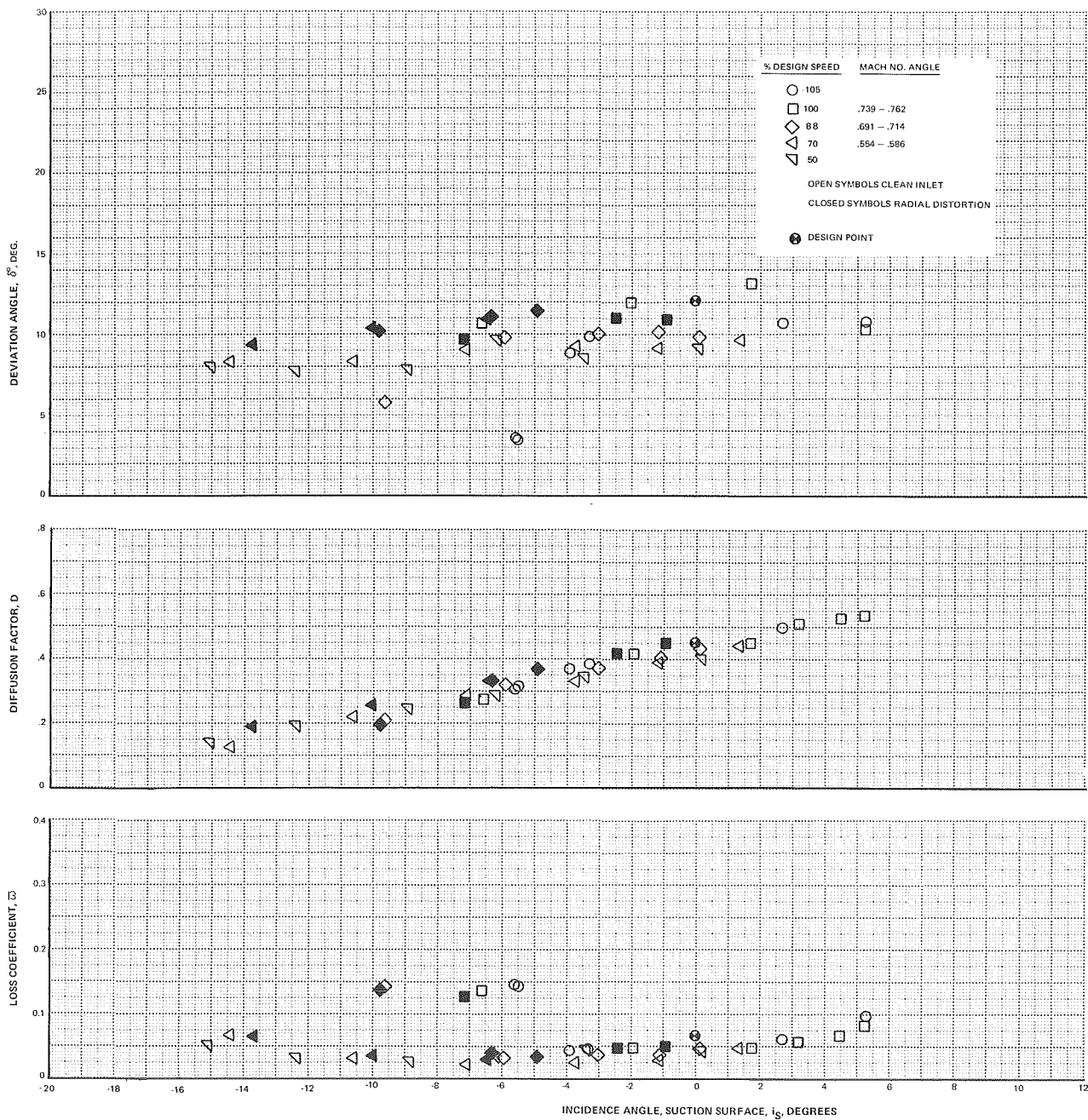


Figure 32b Stator Blade Element Performance With Radially Distorted Inlet Flow, 50 Per-cent Span From Hub

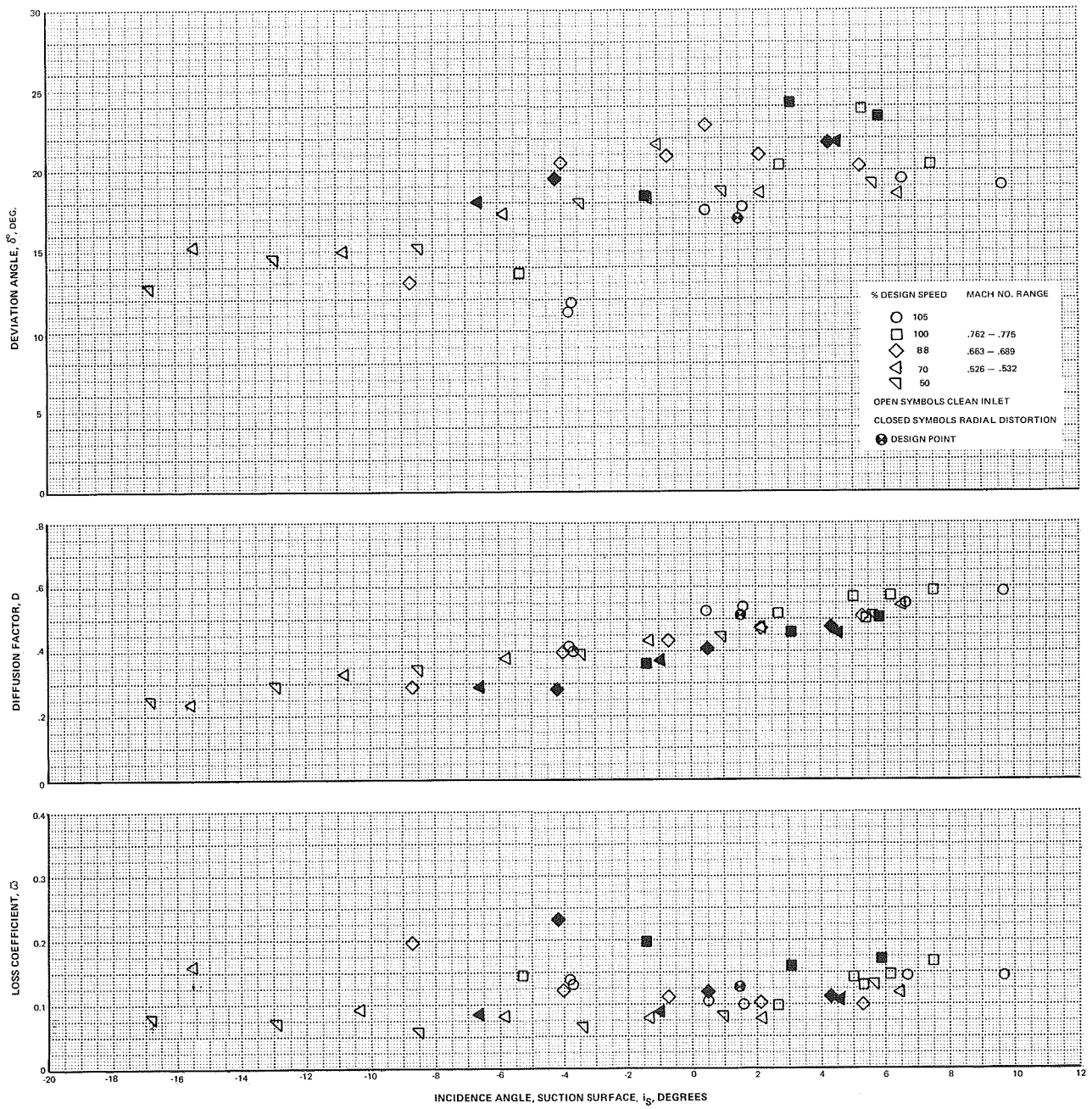


Figure 32c Stator Blade Element Performance With Radially Distorted Inlet Flow, 90 Percent Span From Hub

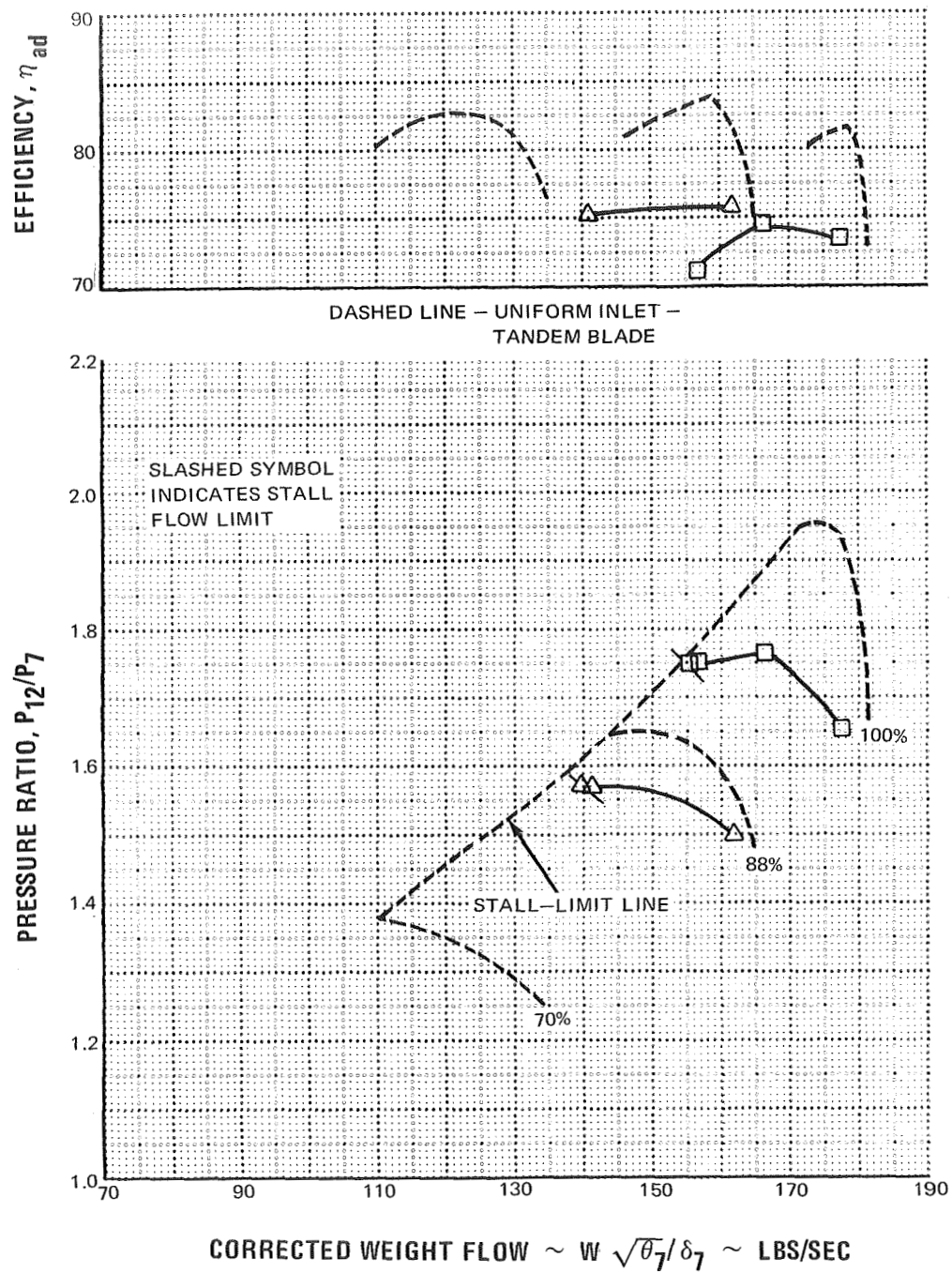


Figure 33 Stage Overall, Performance With Circumferential Distorted Inlet Flow

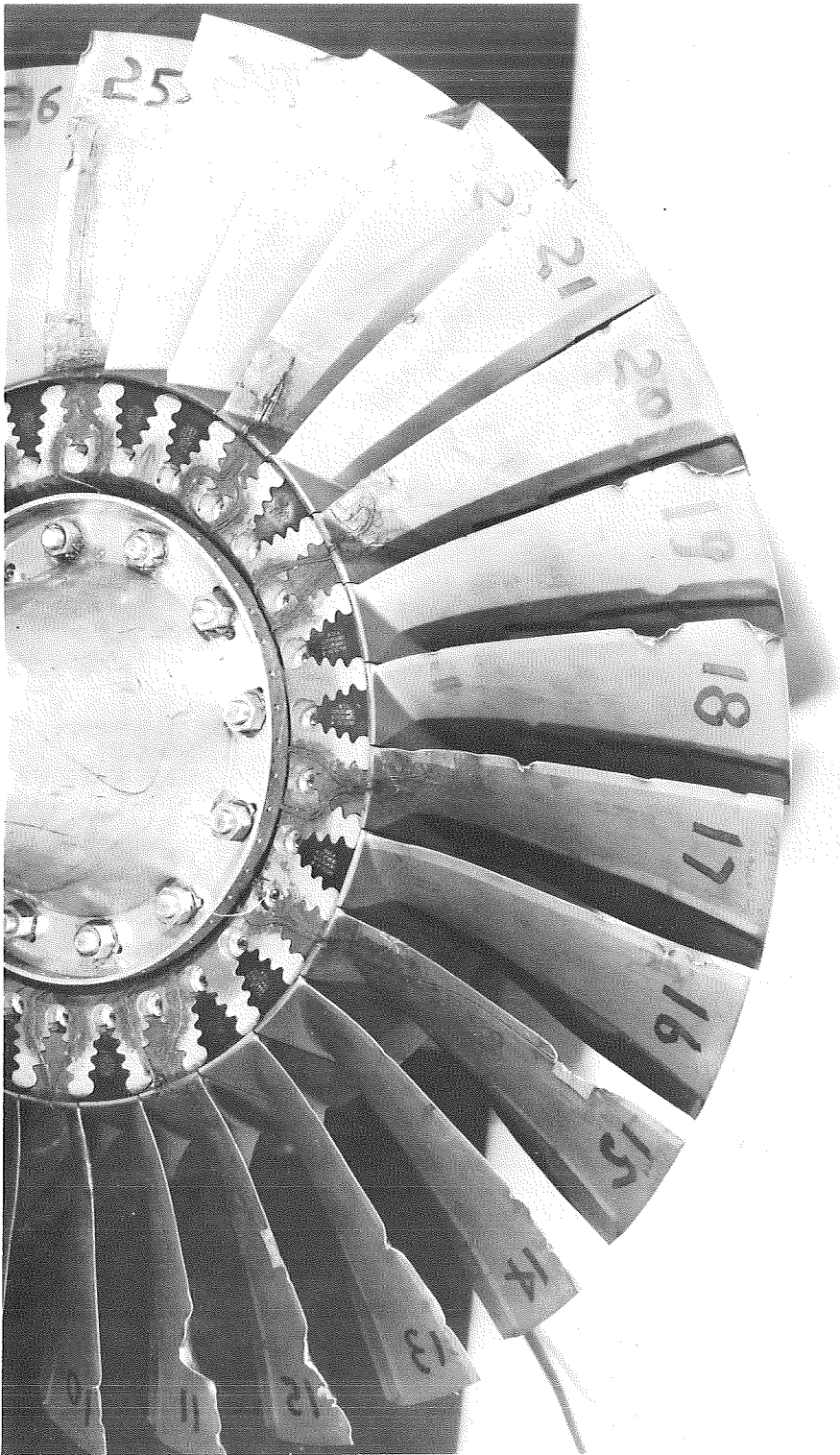


Figure 34 Damaged Tandem Rotor Assembly XPN-8611

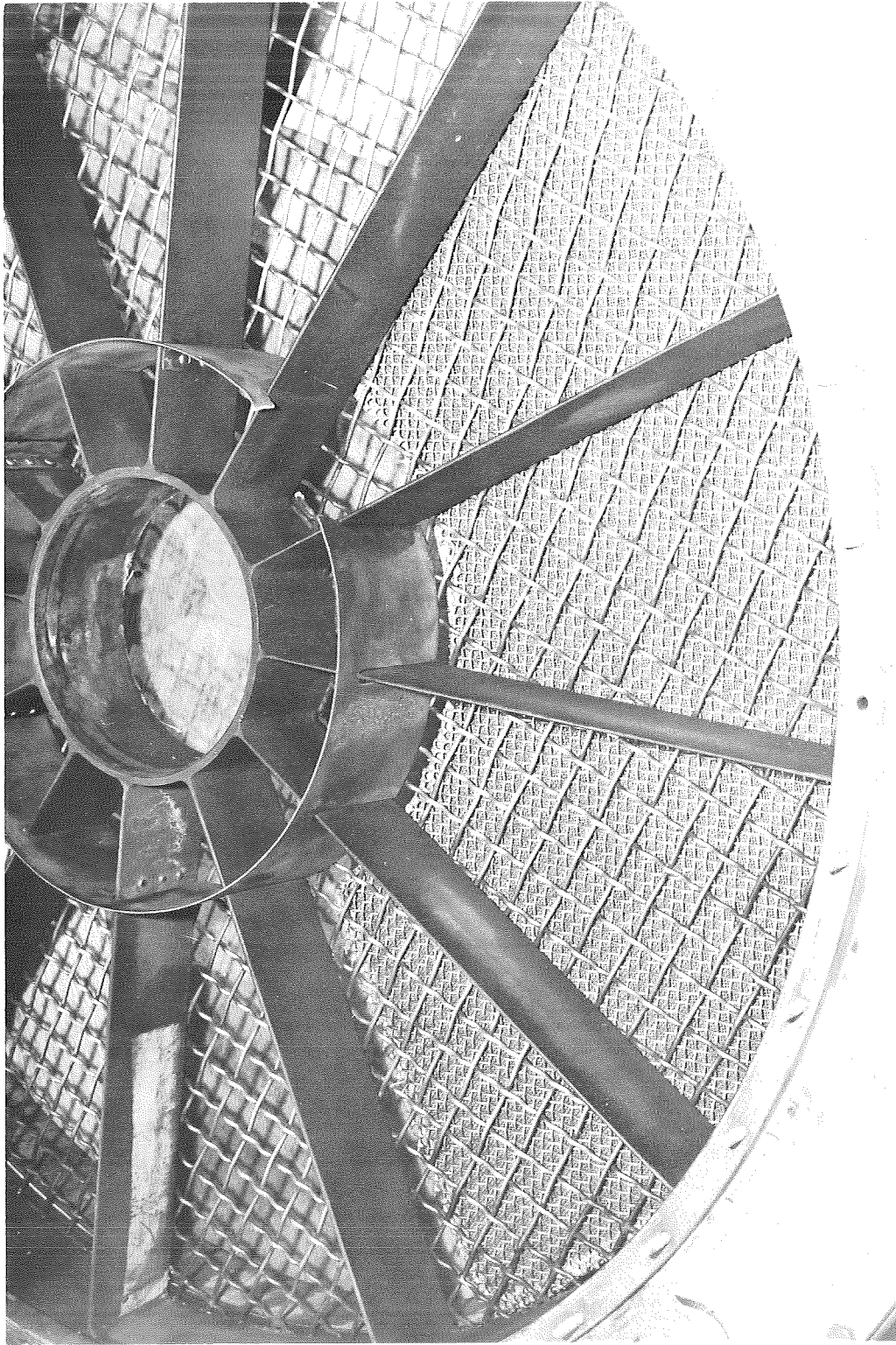


Figure 35 Damaged Distortion Screen Support X-33620

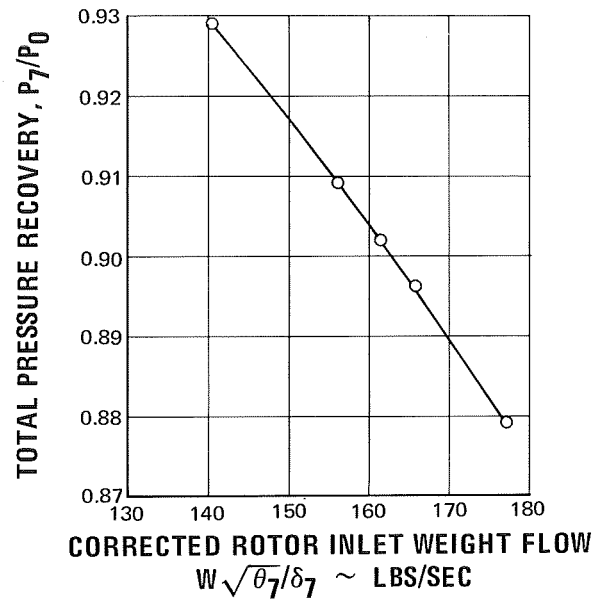


Figure 36 Circumferential Screen Pressure Recovery

STATION 7, 100% DESIGN SPEED
ADJUSTED TO STANDARD DAY INLET CONDITIONS

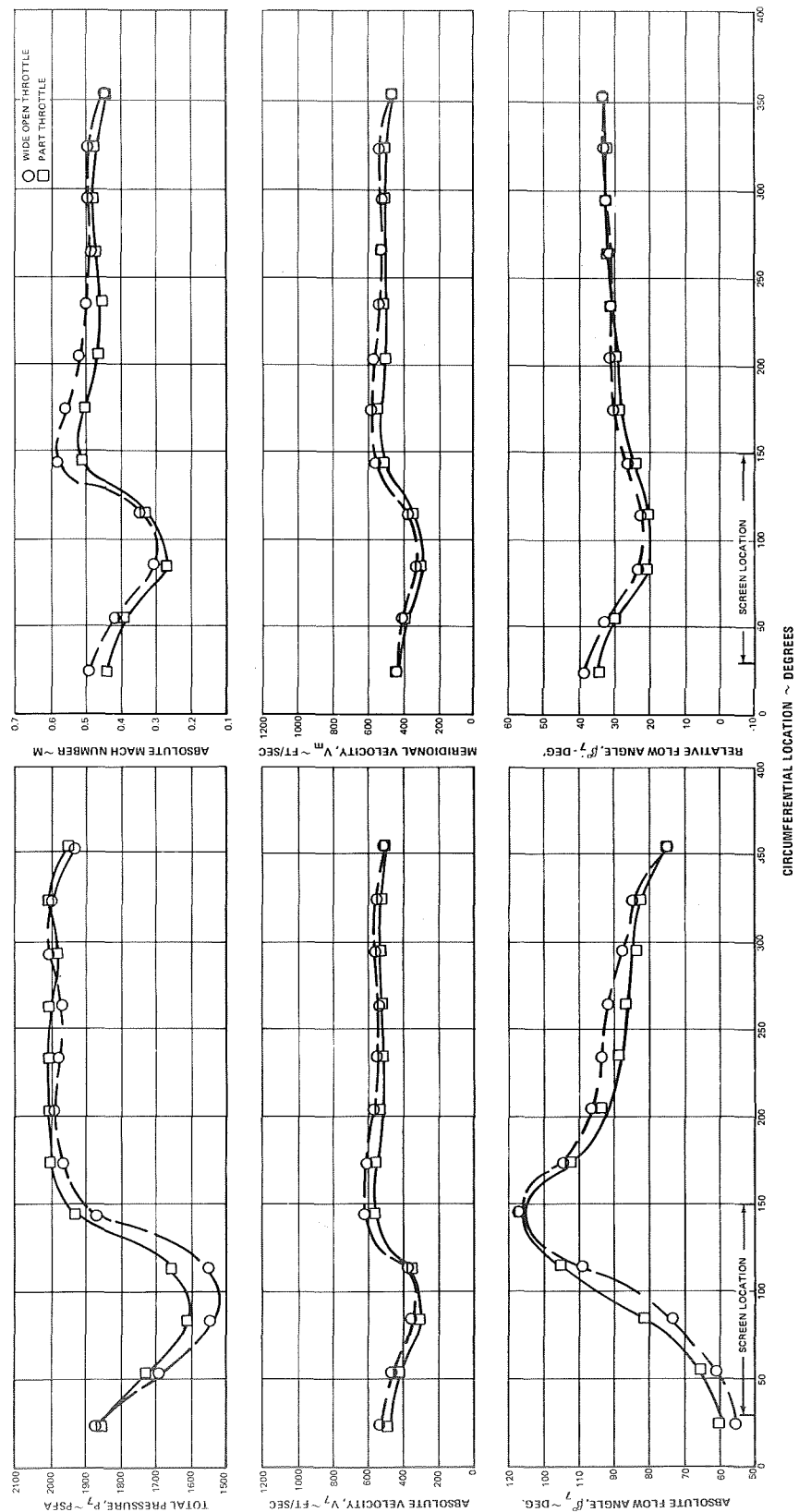


Figure 37 Circumferential Distributions of Rotor Inlet Total Pressure, Absolute Velocity, Meridional Velocity, Absolute Mach Number, and Absolute and Relative Flow Angle, 10 Percent Span From Hub

STATION 7, 100% DESIGN SPEED
ADJUSTED TO STANDARD DAY INLET CONDITIONS

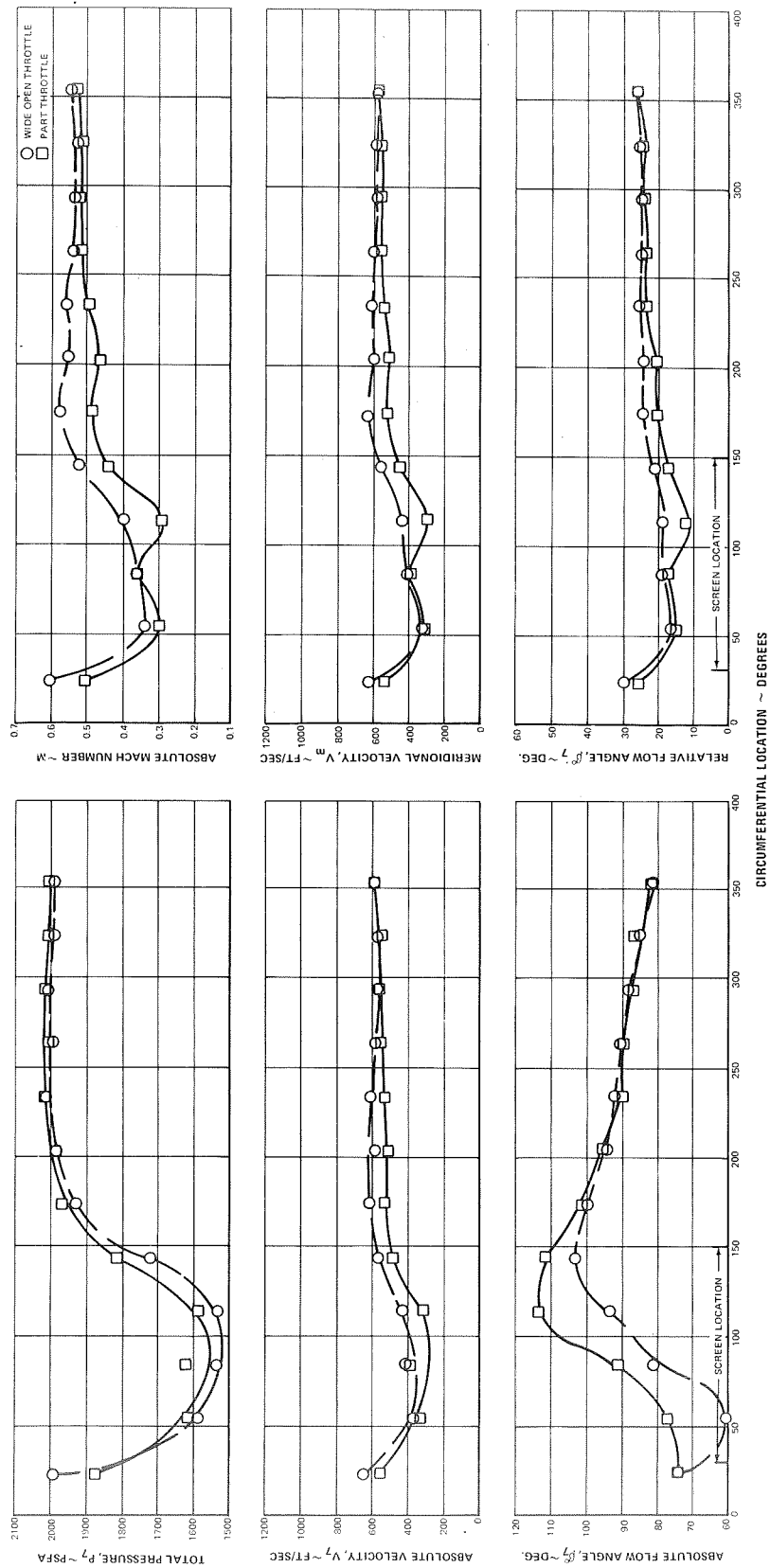


Figure 38 Circumferential Distributions of Rotor Inlet Total Pressure, Absolute Velocity, Meridional Velocity, Absolute Mach Number, and Absolute and Relative Flow Angle, 50 Percent Span From Hub

STATION 7, 100% DESIGN SPEED
ADJUSTED TO STANDARD DAY INLET CONDITIONS

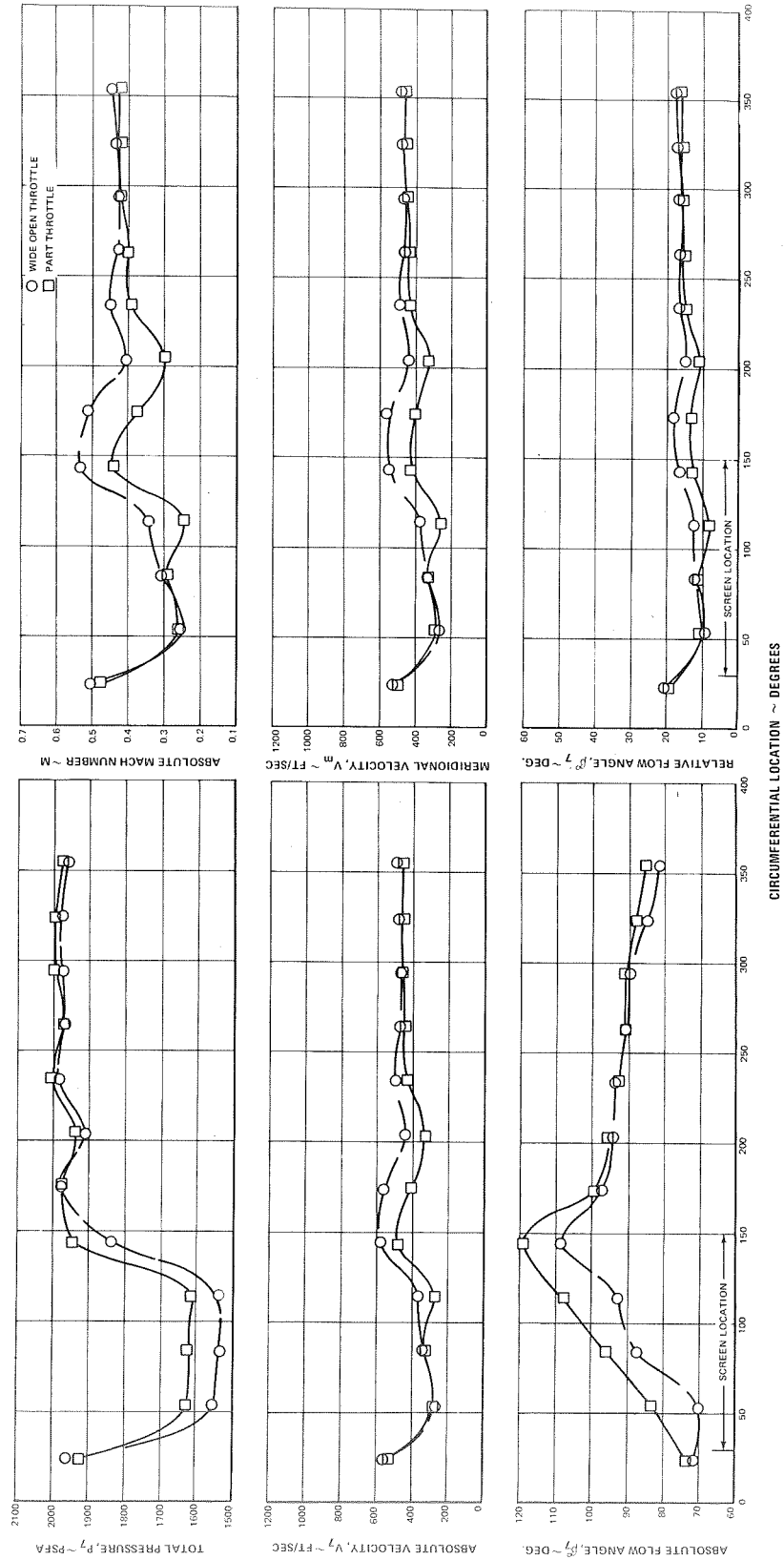


Figure 39 Circumferential Distributions of Rotor Inlet Total Pressure, Absolute Velocity, Meridional Velocity, Absolute Mach Number, and Absolute and Relative Flow Angle, 90 Percent Span From Hub

STATION 12, 100% DESIGN SPEED
ADJUSTED TO STANDARD DAY INLET CONDITIONS

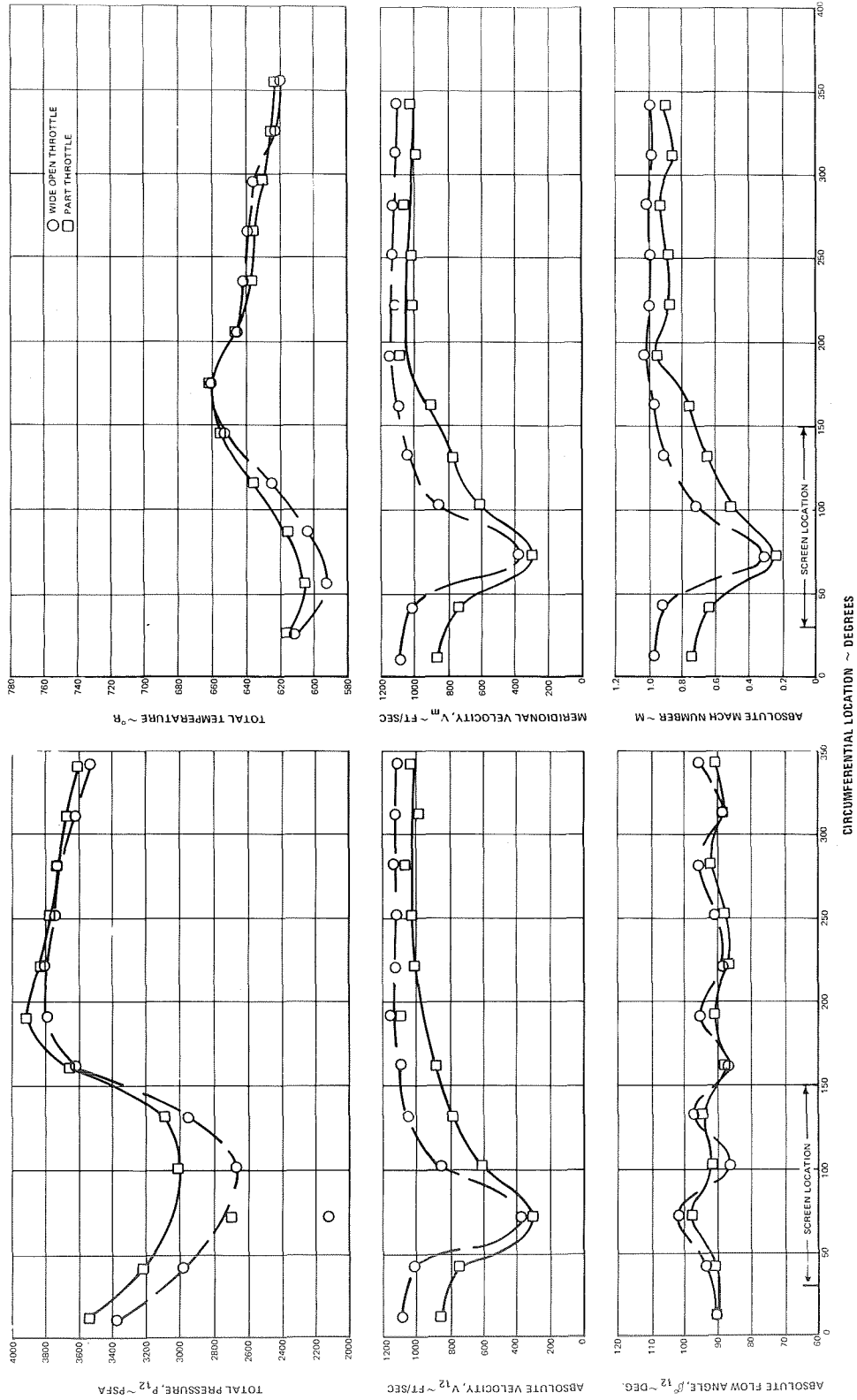


Figure 40 Circumferential Distribution of Stator Discharge Total Pressure, Total Temperature, Absolute Velocity, Meridional Velocity, Absolute Mach Number, and Absolute Air Flow Angle, 10 Percent Span From Hub

STATION 12, 100% DESIGN SPEED
ADJUSTED TO STANDARD INLET CONDITIONS

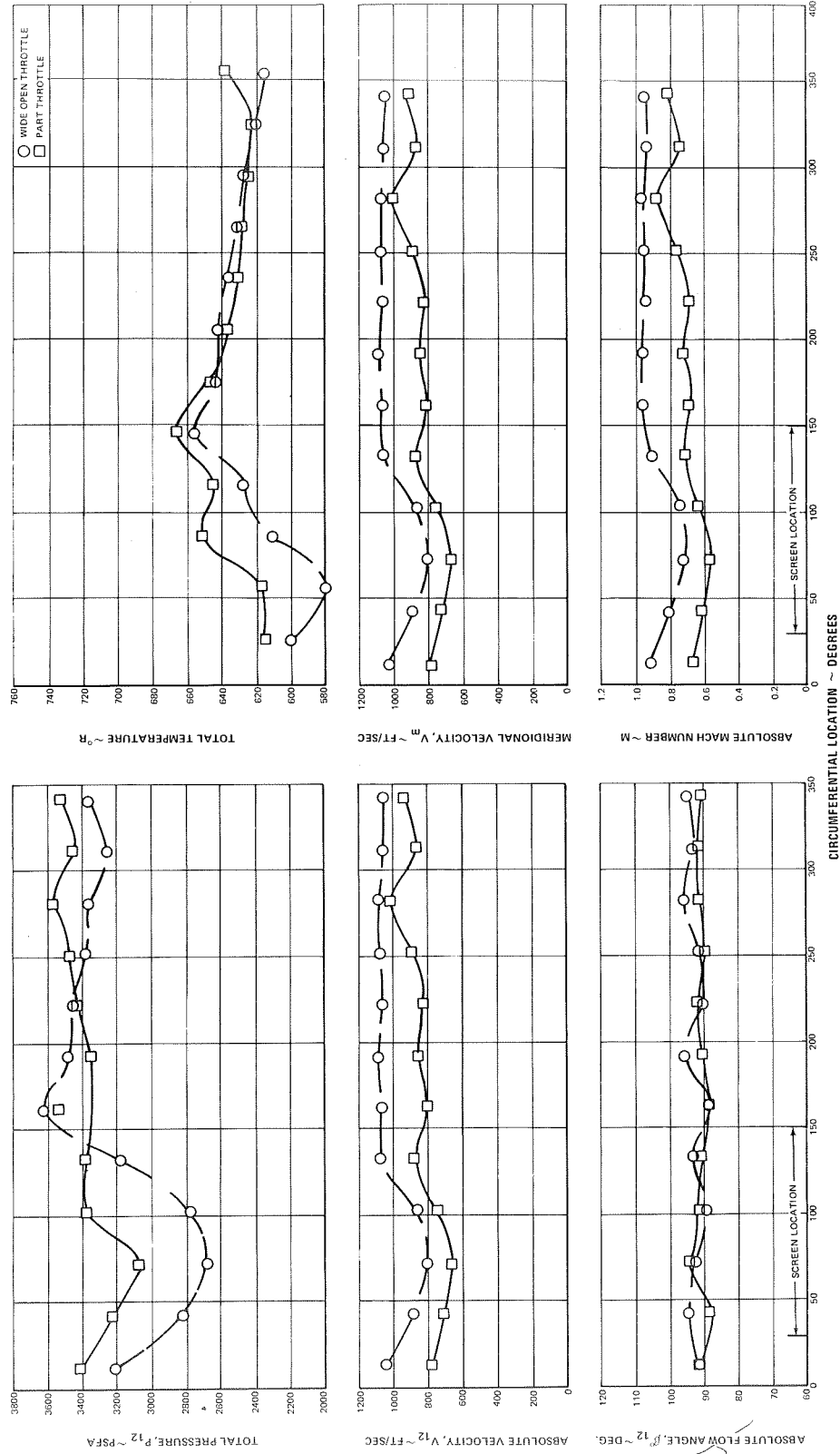


Figure 41 Circumferential Distribution of Stator Discharge Total Pressure, Total Temperature, Absolute Velocity, Meridional Velocity, Absolute Mach Number and Absolute Air Flow Angle, 50 Percent Span From Hub

STATION 12 100% DESIGN SPEED
ADJUSTED TO STANDARD DAY INLET CONDITIONS

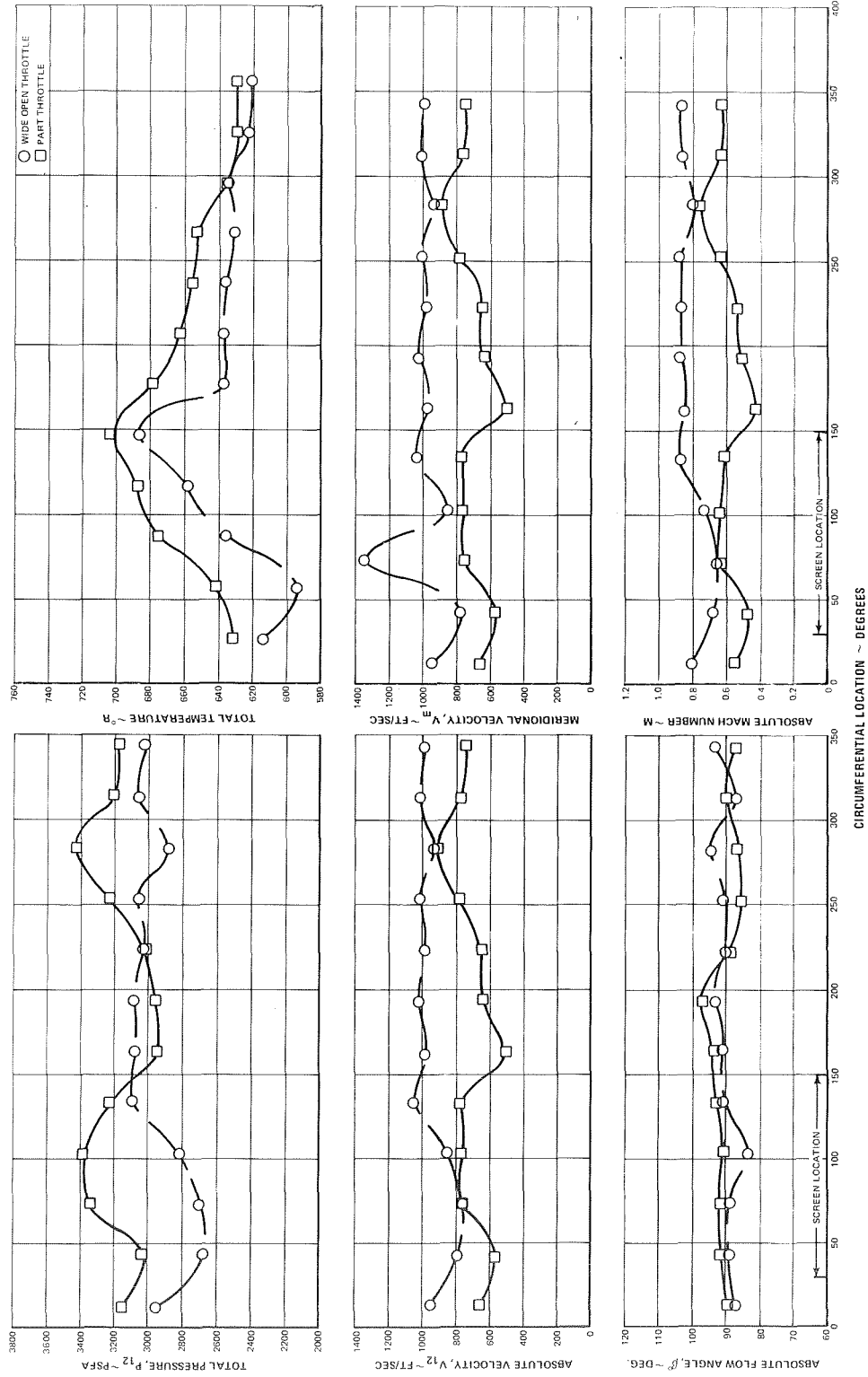


Figure 42 Circumferential Distribution of Stator Discharge Total Pressure, Total Temperature, Absolute Velocity, Meridional Velocity, Absolute Mach Number, and Absolute Air Flow Angle, 90 Percent Span From Hub

STATION 7, 100% DESIGN SPEED, PART THROTTLE

ADJUSTED TO STANDARD DAY INLET CONDITIONS, $W\sqrt{\theta/\delta} = 165.68$

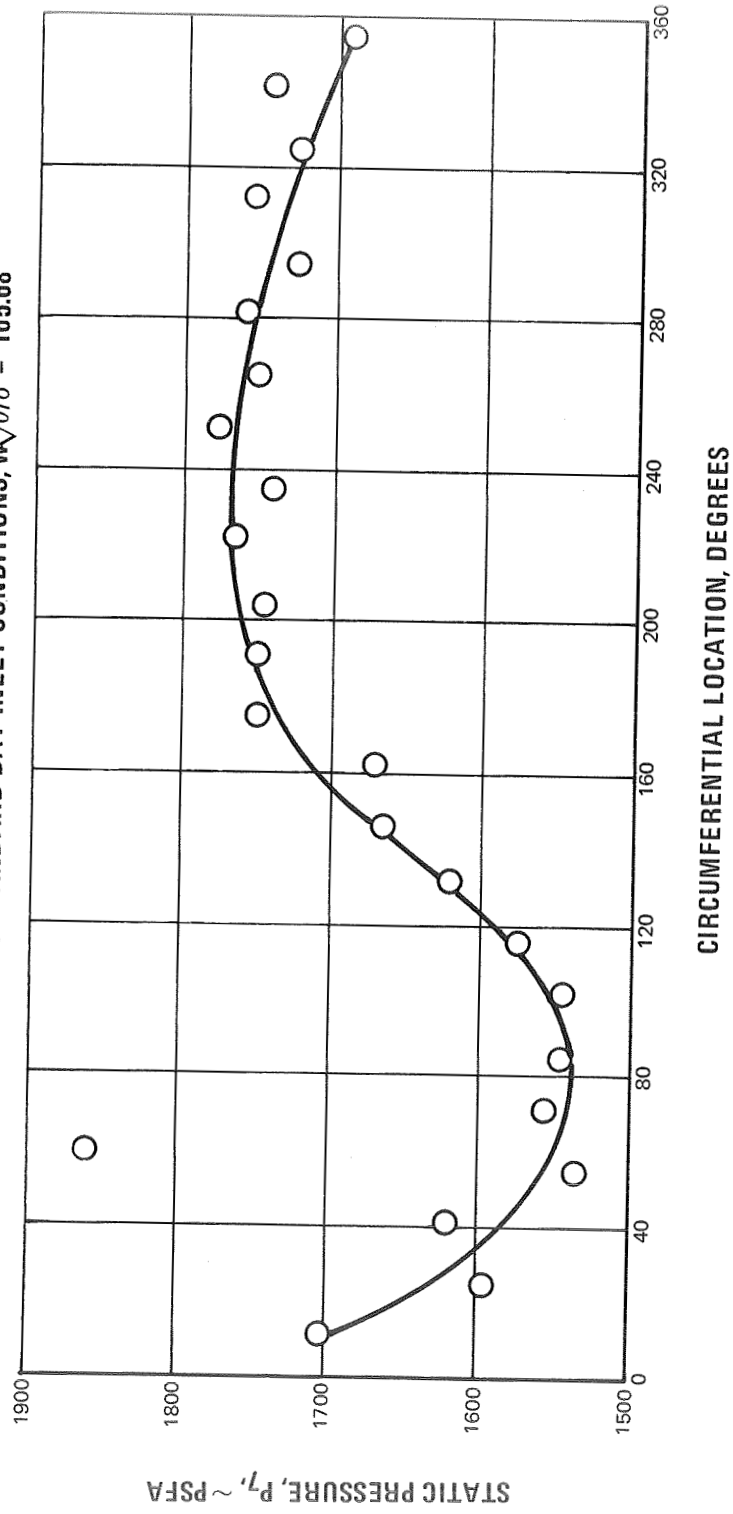


Figure 43 Circumferential Distribution of Rotor Inlet Hub Static Pressure

STATION 7, 100% DESIGN SPEED, PART THROTTLE

ADJUSTED TO STANDARD DAY INLET CONDITIONS, $M_{\infty} \sqrt{\theta/\delta} = 165.68$

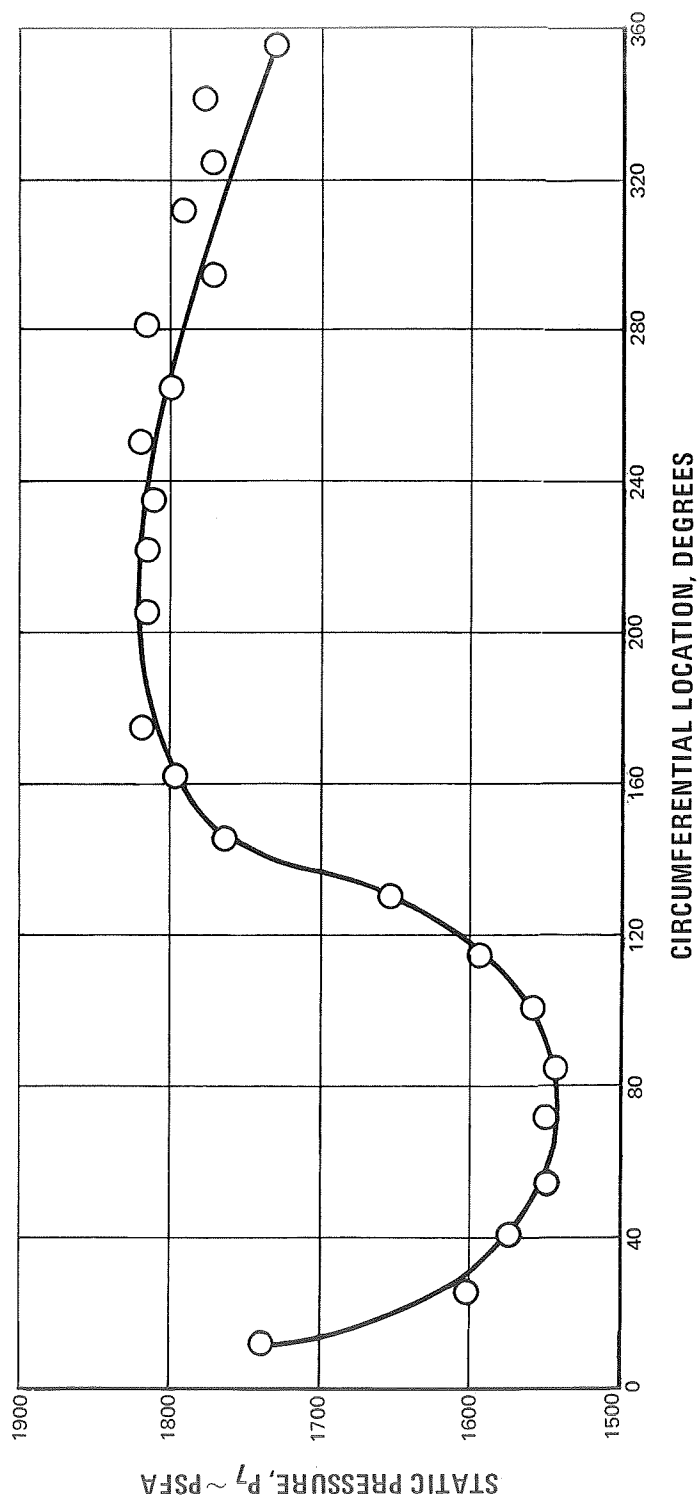


Figure 44 Circumferential Distribution of Rotor Inlet Tip Static Pressure

APPENDIX 1

PERFORMANCE PARAMETERS

APPENDIX 1

PERFORMANCE PARAMETERS

a) Relative total temperature

$$T'_8 = t_8 \left[1 + \frac{\gamma - 1}{2} (M'_8)^2 \right] \quad (\text{rotor in})$$

$$T'_9 = T'_8 + \left[\frac{(\omega r_8)^2 - (\omega r_9)^2}{\frac{2\gamma}{\gamma - 1} R g_c} \right] \quad (\text{rotor out})$$

b) Incidence angle based on mean camber line

$$i_m = \beta'_8 - \beta'^*_8 \quad (\text{rotor})$$

$$i_m = \beta_{10} - \beta^*_{10} \quad (\text{stator})$$

c) Deviation

$$\delta^\circ = \beta'_9 - \beta'^*_9 \quad (\text{rotor})$$

$$\delta^\circ = \beta_{11} - \beta^*_{11} \quad (\text{stator})$$

d) Diffusion factor

$$D = 1 - \frac{V'_9}{V'_8} + \frac{r_9 V_{\theta 9} - r_8 V_{\theta 8}}{(r_8 + r_9) \sigma V'_8} \quad (\text{rotor})$$

$$D = 1 - \frac{V_{11}}{V_{10}} + \frac{r_{10} V_{\theta 10} - r_{11} V_{\theta 11}}{(r_{10} + r_{11}) \sigma V_{10}} \quad (\text{stator})$$

e) Loss coefficient

$$\bar{\omega} = \frac{P'_8 \left[\frac{T'_9}{T'_8} \right]^{\frac{\gamma}{\gamma - 1}} - P'_9}{P'_8 - p_8} \quad (\text{rotor})$$

$$\bar{\omega} = \frac{P_{10} - P_{11}}{P_{10} - p_{10}} \quad (\text{stator})$$

f) Loss parameter

$$\frac{\bar{\omega} \cos \beta' 9}{2 \sigma} \quad (\text{rotor})$$

$$\frac{\bar{\omega} \cos \beta 11}{2 \sigma} \quad (\text{stator})$$

g) Polytropic efficiency

$$1) \eta_p = \frac{\frac{\gamma-1}{\gamma} \ln \left[\frac{P_9}{P_7} \right]}{\ln \left[\frac{T_9}{T_0} \right]} \quad (\text{rotor})$$

$$2) \eta_p = \frac{\frac{\gamma-1}{\gamma} \ln \left[\frac{P_{11}}{P_{10}} \right]}{\ln \left[\frac{t_{11}}{t_{10}} \right]} \quad (\text{stator})$$

h) Adiabatic efficiency

$$\eta_{ad} = \frac{\left[\frac{P_9}{P_7} \right]^{\frac{\gamma-1}{\gamma}} - 1}{\left[\frac{T_{12}}{T_0} \right] - 1} \quad (\text{rotor})$$

$$\eta_{ad} = \frac{\left[\frac{P_{12}}{P_7} \right]^{\frac{\gamma-1}{\gamma}} - 1}{\left[\frac{T_{12}}{T_0} \right] - 1} \quad (\text{stage})$$

i) Wake blockage factor

$$\bar{K} = \frac{\sum_1^n \rho AV}{n} \bigg/ \rho AV_{avg}$$

APPENDIX 2
SYMBOLS

APPENDIX 2

SYMBOLS

| | |
|-----------------|---|
| A | - area, ft ² |
| A _{an} | - annulus area, ft ² |
| A _f | - frontal area, ft ² |
| c | - chord length, in |
| D | - diffusion factor |
| g _c | - conversion factor, 32.17 lb _m ft/lb sec ² |
| i _m | - incidence angle, angle between inlet air direction and line tangent to blade mean camber line at leading edge, degrees (labelled INCM, Table 4) |
| i _s | - incidence angle, angle between inlet air direction and line tangent to blade suction surface at leading edge, degrees (labelled INCS, Table 4) |
| M | - Mach number |
| MR | - mass average in radial directions (Tables 15 and 16) |
| N | - rotor speed, rpm ($N/\sqrt{\theta}$ labelled NCOR, Table 4) |
| P | - total pressure, psfa |
| p | - static pressure, psfa |
| r | - radius, ft |
| R | - gas constant for air, ft lb/lb _m °R |
| S | - blade spacing, in |
| T | - total temperature, °R |
| t | - static temperature, °R |
| t/c | - thickness-to-chord ratio |

| | |
|-----------------|---|
| U | - rotor speed, ft/sec |
| V | - air velocity, ft/sec |
| V _m | - meridional velocity ($V_r^2 + V_z^2$) ^{1/2} , ft/sec (labelled VM, Table 4) |
| W | - weight flow, lbs/sec |
| β | - absolute air angle, $\cot^{-1} (V_m/V_\theta)$, degrees (labelled B, Table 4) |
| β' | - relative air angle, $\cot^{-1} (V_m/V\theta')$, degrees (labelled B', Table 4) |
| γ | - ratio of specific heats for air, 1.4 |
| $\Delta\beta$ | - air turning angle, degrees |
| $\Delta\beta^*$ | - camber angle, degrees |
| δ | - ratio of inlet total pressure to standard pressure of 2116.22 lbs/ft ² |
| δ° | - deviation angle, angle between exit air direction and tangent to blade mean camber line at trailing edge, degrees |
| ϵ | - angle between tangent to streamline projected on meridional plane and axial direction, degrees |
| η | - efficiency, % |
| θ | - ratio of inlet total temperature to standard temperature of 518.6°R |
| ρ | - mass density, lbs-sec ² /ft ⁴ |
| σ | - solidity, ratio of chord to spacing |
| $\bar{\omega}$ | - total pressure loss coefficient (labelled OMEGA - B, Table 4) |
| ω | - angular velocity of rotor, radians/sec |

Superscripts:

| | |
|---|--------------------------------|
| ' | - relative to moving blades |
| * | - designates blade metal angle |

Subscripts:

| | | |
|----------|---|--|
| ad | - | adiabatic |
| p | - | polytropic or profile |
| r | - | radial direction |
| m | - | meridional direction (in z-r plane) |
| sh | - | shock |
| ss | - | suction surface |
| z | - | axial direction |
| θ | - | tangential direction (labelled O, Table 4) |
| 0 | - | plenum chamber |
| 7 | - | instrument plane upstream of rotor |
| 8 | - | station at rotor leading edge |
| 9 | - | station at rotor trailing edge |
| 10 | - | station at stator leading edge |
| 11 | - | station at stator trailing edge |
| 12 | - | instrument plane downstream of stator |

APPENDIX 3

BLADE-ELEMENT AND OVERALL PERFORMANCE WITH
UNIFORM INLET FLOW

TABLE 4

IDENTIFICATION OF BLADE-ELEMENT OVERALL PERFORMANCE TABLE HEADINGS

ROTOR

| DIA-1 IN | DIA-2 IN | V-1 FT/SEC | V-2 FT/SEC | VM-1 FT/SEC | VM-2 FT/SEC | V0-1 FT/SEC | B-1 DEGREE | B-2 DEGREE | B'-1 DEGREE | B'-2 DEGREE | V'-1 FT/SEC | V'-2 FT/SEC | V0'-1 FT/SEC | V0'-2 FT/SEC | U-1 FT/SEC | U-2 FT/SEC |
|-------------|-------------|---------------|---------------|----------------|----------------|----------------|---------------|---------------|----------------|----------------|----------------|----------------|-----------------|-----------------|---------------|---------------|
| 2r8 | 2r9 | V8 | V9 | Vm8 | Vm9 | V08 | V09 | β_8 | β_9 | β'_9 | V'8 | V'9 | V'08 | V'09 | U8 | U9 |

| INCS DEGREE | INCM DEGREE | DEV DEGREE | TURN DEGREE | CAMBER DEGREE | OMEGA-B DEGREE | D-FAC DEGREE | LOSS-P DEGREE | PO2/ POL | EFF-P TOTAL | EFF-AD TOTAL | EFF-P TOTAL | EFF-AD TOTAL | M-1 | M-2 | M'-1 | M'-2 |
|----------------|----------------|------------------|----------------|------------------|---------------------|-----------------|------------------|--|-------------------|-----------------|----------------|-----------------|-----|-----|------|------|
| is8 | im8 | δ_9° | $\Delta\beta$ | $\Delta\beta^*$ | $\bar{\omega}_{sh}$ | D | $\bar{\omega}$ | $\frac{\bar{\omega} \cos \beta'_9}{2\sigma}$ | $\frac{P_9}{P_8}$ | η_p | η_{ad} | η_{ps} | M8 | M9 | M'_8 | M'_9 |
| | | | | | | | | $\frac{(\bar{\omega} - \bar{\omega}_{sh}) \cos \beta'_9}{2\sigma}$ | | | | | | | | |

TO/T0 PO/PO EFF-AD EFF-P
INLET INLET INLET INLET %

$\frac{T_9}{T_0}$ $\frac{P_9}{P_0}$ η_{ad} η_p

STATOR

| DIA-1 IN | DIA-2 IN | V-1 FT/SEC | V-2 FT/SEC | VM-1 FT/SEC | VM-2 FT/SEC | V0-1 FT/SEC | B-1 DEGREE | B-2 DEGREE | B'-1 DEGREE | B'-2 DEGREE | V'-1 FT/SEC | V'-2 FT/SEC | V0'-1 FT/SEC | V0'-2 FT/SEC | U-1 FT/SEC | U-2 FT/SEC |
|-------------|-------------|---------------|---------------|----------------|----------------|----------------|---------------|---------------|----------------|----------------|----------------|----------------|-----------------|-----------------|---------------|---------------|
| 2r10 | 2r11 | V10 | V11 | Vm10 | Vm11 | V010 | V011 | β_{10} | β_{11} | β'_{10} | V'10 | V'11 | V'010 | V'011 | U8 | U9 |

| INCS DEGREE | INCM DEGREE | DEV DEGREE | TURN DEGREE | CAMBER DEGREE | OMEGA-B DEGREE | D-FAC DEGREE | LOSS-P DEGREE | PO2/ POL | EFF-P TOTAL | EFF-AD TOTAL | EFF-P TOTAL | EFF-AD TOTAL | M-1 | M-2 | M'-1 | M'-2 |
|----------------|----------------|---------------------|----------------|------------------|---------------------|-----------------|------------------|---|-------------------------|-----------------|----------------|-----------------|-----|-----|---------|---------|
| is10 | im10 | δ_{11}° | $\Delta\beta$ | $\Delta\beta^*$ | $\bar{\omega}_{sh}$ | D | $\bar{\omega}$ | $\frac{\bar{\omega} \cos \beta'_{11}}{2\sigma}$ | $\frac{P_{11}}{P_{10}}$ | η_p | η_{ad} | η_{ps} | M10 | M11 | M'_{10} | M'_{11} |
| | | | | | | | | $\frac{(\bar{\omega} - \bar{\omega}_{sh}) \cos \beta'_{11}}{2\sigma}$ | | | | | | | | |

STAGE PARAMETERS

| NCORR RPM | WCORR LBM/SEC | TO/T0 INLET | PO/PO INLET | EFF-AD INLET | EFF-P INLET | WC/A-1 LBM/SEC | WC/δ | W/√θ | W/√θ _{an} |
|---------------------------|---------------------------------|----------------------|----------------------|-----------------|----------------|--|------|------|--------------------|
| $\frac{N}{\sqrt{\theta}}$ | $\frac{W\sqrt{\theta}}{\delta}$ | $\frac{T_{11}}{T_0}$ | $\frac{P_{11}}{P_0}$ | η_{ad} | η_p | $\frac{W\sqrt{\theta}}{\delta A_{an}}$ | | | |

TABLE 5
BLADE-ELEMENT AND OVERALL PERFORMANCE DESIGN DATA

ROTOR

| %SPAN | DIA-1 IN | DIA-2 IN | V-1 FT/SEC | V-2 FT/SEC | VM-1 FT/SEC | VM-2 FT/SEC | V0-1 FT/SEC | V0-2 FT/SEC | B-1 DEGREE | B-2 DEGREE | B'-1 DEGREE | B'-2 DEGREE | V'-1 FT/SEC | V'-2 FT/SEC | V0'-1 FT/SEC | V0'-2 FT/SEC | U-1 FT/SEC | U-2 FT/SEC |
|--|-------------|-------------|---------------|---------------|----------------|----------------|----------------|----------------|---------------|---------------|----------------|----------------|----------------|----------------|-----------------|-----------------|---------------|---------------|
| 5 | 17.467 | 19.769 | 615.494 | 970.440 | 615.49 | 580.18 | 0 | 777.90 | 0 | 53.29 | 53.91 | 17.22 | 1044.7 | 607.39 | -844.1 | -179.7 | 844.1 | 957.6 |
| 10 | 18.467 | 20.408 | 625.765 | 946.940 | 625.765 | 600.49 | 0 | 732.19 | 0 | 50.65 | 54.99 | 23.11 | 1090.4 | 632.85 | -893.0 | -256.1 | 893.0 | 988.3 |
| 15 | 19.467 | 21.047 | 636.763 | 926.804 | 636.763 | 604.91 | 0 | 702.17 | 0 | 49.26 | 55.94 | 27.67 | 1136.6 | 682.97 | -945.5 | -317.0 | 941.5 | 1019.2 |
| 20 | 22.314 | 22.964 | 668.382 | 877.741 | 668.382 | 592.25 | 0 | 647.81 | 0 | 47.57 | 58.20 | 38.07 | 1268.2 | 732.20 | -1077.8 | -463.7 | 1077.8 | 1111.5 |
| 30 | 25.791 | 25.520 | 697.536 | 829.215 | 697.536 | 574.46 | 0 | 597.98 | 0 | 46.15 | 60.74 | 48.03 | 1426.8 | 856.92 | -1244.7 | -638.5 | 1244.7 | 1236.5 |
| 50 | 28.954 | 28.076 | 702.305 | 801.681 | 702.305 | 561.56 | 0 | 572.13 | 0 | 45.70 | 65.49 | 57.97 | 1565.1 | 968.37 | -1397.6 | -788.9 | 1597.6 | 1361.0 |
| 85 | 31.295 | 29.993 | 686.769 | 793.611 | 686.769 | 554.34 | 0 | 567.91 | 0 | 45.70 | 65.49 | 57.97 | 1565.1 | 1045.08 | -1505.9 | -885.9 | 1505.9 | 1453.8 |
| 90 | 31.883 | 30.630 | 678.618 | 795.003 | 678.618 | 537.71 | 0 | 585.56 | 0 | 47.44 | 66.21 | 59.09 | 1682.2 | 1046.70 | -1539.2 | -898.0 | 1539.2 | 1483.6 |
| 95 | 32.499 | 31.271 | 670.550 | 800.046 | 670.550 | 493.36 | 0 | 629.81 | 0 | 51.93 | 66.89 | 61.51 | 1708.1 | 1012.35 | -1571.0 | -884.0 | 1571.0 | 1513.8 |
| CAMBER OMEGA-BD-FAC OMEGA-B LOSS-P P02/ EFF-P EFF-AD EFF-P | | | | | | | | | | | | | | | | | | |
| %SPAN | INCS | DEGREE | INCH | DEV | TURN | DEGREE | DEGREE | SHOCK | LOSS-P | LOSS-P | LOSS-P | LOSS-P | EFF-P | EFF-AD | EFF-P | M-1 | M-2 | M'-1 |
| 5 | -1.40 | 4.65 | 12.20 | 36.69 | 47.17 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 10 | -0.96 | 4.72 | 10.75 | 31.88 | 39.99 | 0.132 | 0.132 | 0.132 | 0.132 | 0.132 | 0.132 | 0.132 | 0.132 | 0.132 | 0.132 | 0.132 | 0.132 | 0.132 |
| 15 | -0.55 | 4.70 | 9.80 | 28.27 | 34.03 | 0.083 | 0.083 | 0.083 | 0.083 | 0.083 | 0.083 | 0.083 | 0.083 | 0.083 | 0.083 | 0.083 | 0.083 | 0.083 |
| 30 | -0.40 | 4.46 | 7.50 | 20.13 | 24.17 | 0.046 | 0.046 | 0.046 | 0.046 | 0.046 | 0.046 | 0.046 | 0.046 | 0.046 | 0.046 | 0.046 | 0.046 | 0.046 |
| 50 | 1.22 | 4.03 | 4.60 | 12.71 | 14.60 | 0.073 | 0.073 | 0.073 | 0.073 | 0.073 | 0.073 | 0.073 | 0.073 | 0.073 | 0.073 | 0.073 | 0.073 | 0.073 |
| 70 | 1.89 | 3.70 | 3.10 | 8.77 | 9.06 | 0.1083 | 0.1083 | 0.1083 | 0.1083 | 0.1083 | 0.1083 | 0.1083 | 0.1083 | 0.1083 | 0.1083 | 0.1083 | 0.1083 | 0.1083 |
| 85 | 2.29 | 3.45 | 3.42 | 7.52 | 7.93 | 0.1327 | 0.1327 | 0.1327 | 0.1327 | 0.1327 | 0.1327 | 0.1327 | 0.1327 | 0.1327 | 0.1327 | 0.1327 | 0.1327 | 0.1327 |
| 90 | 2.37 | 3.40 | 3.80 | 7.12 | 7.60 | 0.1399 | 0.1399 | 0.1399 | 0.1399 | 0.1399 | 0.1399 | 0.1399 | 0.1399 | 0.1399 | 0.1399 | 0.1399 | 0.1399 | 0.1399 |
| 95 | 2.50 | 3.32 | 4.40 | 5.38 | 7.42 | 0.1508 | 0.1508 | 0.1508 | 0.1508 | 0.1508 | 0.1508 | 0.1508 | 0.1508 | 0.1508 | 0.1508 | 0.1508 | 0.1508 | 0.1508 |

TO / P0 / EFF-AD EFF-P
TO P0 % %

1.247 2.0 88.7 89.8

STATOR

| %SPAN | DIA-1 IN | DIA-2 IN | V-1 FT/SEC | V-2 FT/SEC | VM-1 FT/SEC | VM-2 FT/SEC | V0-1 FT/SEC | V0-2 FT/SEC | B-1 DEGREE | B-2 DEGREE | B'-1 DEGREE | B'-2 DEGREE | V'-1 FT/SEC | V'-2 FT/SEC | V0'-1 FT/SEC | V0'-2 FT/SEC | U-1 FT/SEC | U-2 FT/SEC |
|--|-------------|-------------|---------------|---------------|----------------|----------------|----------------|----------------|---------------|---------------|----------------|----------------|----------------|----------------|-----------------|-----------------|---------------|---------------|
| 5 | 20.409 | 21.489 | 1010.79 | 663.52 | 675.09 | 663.52 | 732.30 | 0 | 48.10 | 0 | 19.42 | 57.50 | 715.79 | 1234.7 | -237.9 | -1041.2 | 980.2 | 1041.3 |
| 10 | 21.008 | 21.961 | 992.99 | 690.19 | 693.11 | 690.19 | 711.08 | 0 | 45.74 | 0 | 23.87 | 57.03 | 757.90 | 1268.2 | -306.6 | -1063.9 | 1017.7 | 1063.9 |
| 15 | 21.589 | 22.432 | 978.26 | 699.94 | 698.84 | 699.94 | 684.55 | 0 | 44.41 | 0 | 27.32 | 57.23 | 786.54 | 1292.8 | -360.9 | -1086.9 | 1045.4 | 1086.9 |
| 30 | 23.314 | 23.902 | 944.83 | 704.91 | 696.66 | 704.91 | 638.25 | 0 | 42.50 | 0 | 35.12 | 58.65 | 851.70 | 1354.6 | -489.9 | -1156.7 | 1128.2 | 1156.7 |
| 50 | 25.601 | 25.893 | 916.00 | 694.70 | 694.58 | 694.70 | 597.17 | 0 | 40.69 | 0 | 42.71 | 61.00 | 945.18 | 1432.5 | -641.0 | -1232.7 | 1238.2 | 1232.7 |
| 70 | 27.818 | 27.902 | 905.67 | 685.34 | 696.37 | 685.34 | 579.05 | 0 | 39.75 | 0 | 47.72 | 63.08 | 1035.02 | 1513.3 | -765.7 | -1349.2 | 1344.7 | 1349.2 |
| 85 | 29.408 | 29.382 | 910.49 | 675.22 | 701.25 | 675.22 | 580.71 | 0 | 39.63 | 0 | 50.18 | 68.31 | 1095.06 | 1573.3 | -841.0 | -1421.0 | 1421.7 | 1421.0 |
| 90 | 29.914 | 29.856 | 916.81 | 670.46 | 692.46 | 670.46 | 600.86 | 0 | 40.95 | 0 | 50.67 | 65.09 | 1092.45 | 1591.7 | -840.9 | -1443.6 | 1443.8 | 1443.6 |
| 95 | 30.382 | 30.293 | 927.39 | 663.86 | 682.65 | 663.86 | 648.80 | 0 | 44.40 | 0 | 51.09 | 65.04 | 1054.84 | 1608.9 | -820.7 | -1465.5 | 1465.5 | 1465.5 |
| CAMBER OMEGA-BD-FAC OMEGA-B LOSS-P P02/ EFF-P EFF-AD EFF-P | | | | | | | | | | | | | | | | | | |
| %SPAN | INCS | DEGREE | INCH | DEV | TURN | DEGREE | DEGREE | SHOCK | LOSS-P | LOSS-P | LOSS-P | LOSS-P | EFF-P | EFF-AD | EFF-P | M-1 | M-2 | M'-1 |
| 5 | 1.95 | 4.82 | 11.80 | 48.10 | 55.91 | 0 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 10 | 1.40 | 3.33 | 11.05 | 45.74 | 53.88 | 0 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 15 | 0 | 3.0 | 11.00 | 44.41 | 52.35 | 0 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 30 | 0 | 3.1 | 11.25 | 42.50 | 50.68 | 0 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 50 | 0 | 3.2 | 12.05 | 40.69 | 49.35 | 0 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 70 | 0 | 3.3 | 13.40 | 39.75 | 49.93 | 0 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 85 | -31 | 3.62 | 15.43 | 39.63 | 51.98 | 0 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 90 | 1.45 | 4.73 | 17.00 | 40.95 | 53.84 | 0 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 95 | 3.80 | 7.00 | 18.90 | 44.40 | 56.04 | 0 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |

NCOR-1 WCOR-1 TO / P0 / EFF-AD EFF-P WC/A-1
RPM LBW/SEC TO P0 % % LBW/SEC
CONF

11,110.0 187.1 1.247 1.936 84.2 85.6 42.04

1.247 2.0 88.7 89.8 1.247 1.936 84.2 85.6 42.04

TABLE 6.1

BLADE-ELEMENT AND OVERALL PERFORMANCE WITH UNIFORM INLET
50 PERCENT OF DESIGN SPEED

Rotor

| %SPAN | DIA-1 | DIA-2 | V-1 | V-2 | VM-1 | VM-2 | VO-1 | VO-2 | B-1 | B-2 | B*-1 | B*-2 | V*-1 | V*-2 | VO*-1 | VO*-2 | U-1 | U-2 |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | IN | IN | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | DEGREE | DEGREE | DEGREE | DEGREE | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC |
| 5 | 17.467 | 19.769 | 281.3 | 570.5 | 281.3 | 441.1 | 0 | 361.8 | 0 | 38.36 | 56.36 | 14.82 | 507.8 | 456.3 | -422.8 | -116.7 | 422.8 | 478.5 |
| 10 | 18.467 | 20.408 | 287.1 | 535.5 | 287.1 | 414.7 | 0 | 338.7 | 0 | 35.24 | 57.29 | 20.53 | 531.3 | 443.2 | -447.2 | -155.2 | 447.2 | 494.0 |
| 15 | 19.467 | 21.047 | 292.2 | 509.6 | 292.2 | 401.9 | 0 | 313.2 | 0 | 33.91 | 58.20 | 25.97 | 554.4 | 447.7 | -471.2 | -196.2 | 471.2 | 509.5 |
| 30 | 22.314 | 22.964 | 302.3 | 471.6 | 302.3 | 395.0 | 0 | 257.4 | 0 | 33.07 | 60.74 | 37.01 | 619.0 | 495.6 | -540.1 | -298.5 | 540.1 | 555.9 |
| 50 | 25.791 | 25.520 | 305.7 | 424.9 | 305.7 | 372.2 | 0 | 205.0 | 0 | 28.82 | 63.91 | 47.91 | 695.1 | 556.1 | -624.3 | -12.8 | 624.3 | 617.7 |
| 70 | 28.954 | 28.076 | 300.1 | 385.5 | 300.1 | 348.6 | 0 | 164.5 | 0 | 25.26 | 66.82 | 55.90 | 762.4 | 622.0 | -700.9 | -515.1 | 700.9 | 679.6 |
| 85 | 31.295 | 29.993 | 290.9 | 373.2 | 290.9 | 339.4 | 0 | 155.1 | 0 | 24.58 | 68.99 | 59.27 | 811.5 | 664.2 | -757.5 | -570.9 | 757.5 | 726.0 |
| 90 | 31.883 | 30.330 | 288.1 | 350.1 | 288.1 | 311.5 | 0 | 159.7 | 0 | 23.18 | 69.53 | 61.84 | 823.8 | 660.0 | -771.7 | -581.7 | 771.7 | 741.4 |
| 95 | 32.499 | 31.271 | 285.6 | 310.3 | 285.6 | 263.6 | 0 | 143.8 | 0 | 31.85 | 70.04 | 65.04 | 836.9 | 649.1 | -786.7 | -593.2 | 786.7 | 756.9 |

| %SPAN | INCS | INCH | DEGREE | DEGREE | TURN | CAMBER | OMEGA-B | D-FAC | OMEGA-B | LOSS-P | PO2/ | EFF-P | EFF-AD | EFF-P | M-1 | M-2 | M*-1 | M*-2 |
|-------|------|------|--------|--------|-------|--------|---------|--------|---------|--------|--------|-------|--------|-------|------|------|------|------|
| | | | | | | | | | | | | | | | | | | |
| 5 | 1.00 | 7.43 | 12.95 | 41.54 | 47.12 | 0.000 | 2677 | 0.511 | 0.109 | 0.109 | 1.2004 | 96.44 | 96.44 | 98.01 | 2545 | 5100 | 4814 | 4079 |
| 10 | 1.35 | 7.66 | 10.81 | 36.75 | 39.90 | 0.000 | 3198 | 0.1231 | 0.0285 | 0.0265 | 1.1799 | 7036 | 7036 | 7586 | 2603 | 4777 | 4858 | 3954 |
| 15 | 1.74 | 7.48 | 9.50 | 32.23 | 34.06 | 0.000 | 3336 | 0.1340 | 0.0290 | 0.0290 | 1.1664 | 8806 | 8806 | 8777 | 2649 | 4542 | 5076 | 3990 |
| 30 | 2.95 | 6.88 | 7.28 | 23.75 | 24.18 | 0.000 | 3129 | 0.914 | 0.197 | 0.197 | 1.1498 | 8887 | 8887 | 7989 | 2734 | 4201 | 5558 | 4415 |
| 50 | 4.39 | 7.01 | 5.87 | 16.00 | 14.69 | 0.000 | 2893 | 0.869 | 0.178 | 0.178 | 1.1261 | 8522 | 8522 | 7784 | 2755 | 3783 | 6322 | 4951 |
| 70 | 5.37 | 7.16 | 5.41 | 10.92 | 9.16 | 0.000 | 2560 | 0.838 | 0.159 | 0.159 | 1.1052 | 8099 | 8099 | 7466 | 2703 | 3431 | 6900 | 5537 |
| 85 | 5.63 | 6.87 | 5.16 | 9.72 | 8.02 | 0.000 | 2491 | 0.981 | 0.181 | 0.181 | 1.0982 | 7531 | 7493 | 6790 | 2626 | 3319 | 7301 | 5908 |
| 90 | 5.70 | 6.77 | 6.74 | 7.69 | 7.66 | 0.000 | 2688 | 1.442 | 0.251 | 0.251 | 1.0878 | 5440 | 6391 | 5788 | 2597 | 3107 | 7426 | 5857 |
| 95 | 5.84 | 6.74 | 10.20 | 4.00 | 7.47 | 0.000 | 2964 | 2.014 | 0.307 | 0.307 | 1.0719 | 5082 | 5082 | 4842 | 2575 | 2746 | 7542 | 5743 |

STA-1 STA-2
---LOCAL---

Stator

| %SPAN | DIA-1 | DIA-2 | V-1 | V-2 | VM-1 | VM-2 | VO-1 | VO-2 | B-1 | B-2 | B*-1 | B*-2 | V*-1 | V*-2 | VO*-1 | VO*-2 | U-1 | U-2 |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | IN | IN | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | DEGREE | DEGREE | DEGREE | DEGREE | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC |
| 5 | 20.409 | 21.489 | 610.4 | 592.0 | 499.7 | 592.0 | 350.5 | -6 | 35.04 | -0.6 | 16.03 | 41.34 | 520.0 | 788.4 | -143.5 | -520.8 | 494.0 | 520.2 |
| 10 | 21.008 | 21.961 | 575.5 | 571.6 | 472.1 | 571.4 | 329.1 | -13.0 | 34.87 | -1.31 | 20.81 | 43.62 | 505.4 | 789.5 | -179.4 | -544.6 | 508.5 | 531.6 |
| 15 | 21.589 | 22.432 | 550.5 | 553.1 | 458.1 | 552.7 | 305.4 | -20.9 | 33.95 | -2.18 | 25.38 | 45.58 | 507.5 | 789.7 | -217.4 | -563.9 | 524.6 | 543.0 |
| 30 | 23.314 | 23.902 | 513.4 | 515.1 | 446.6 | 515.4 | 253.2 | -27.5 | 29.54 | -3.06 | 34.92 | 49.62 | 544.7 | 795.7 | -311.1 | -506.1 | 564.3 | 578.6 |
| 50 | 25.601 | 25.893 | 470.6 | 472.5 | 424.2 | 471.4 | 204.0 | -32.4 | 25.66 | -3.94 | 44.38 | 54.42 | 594.3 | 810.5 | -415.7 | -559.1 | 619.7 | 626.8 |
| 70 | 27.818 | 27.902 | 441.5 | 431.6 | 409.1 | 429.6 | 166.0 | -32.4 | 22.08 | -5.64 | 51.11 | 57.10 | 651.8 | 836.6 | -507.4 | -717.8 | 675.4 | 675.4 |
| 85 | 29.408 | 29.382 | 441.6 | 408.1 | 412.1 | 404.6 | 158.6 | -35.2 | 21.05 | -7.97 | 53.32 | 61.54 | 689.9 | 849.0 | -553.2 | -746.4 | 711.8 | 711.2 |
| 90 | 29.914 | 29.856 | 426.8 | 391.3 | 393.9 | 390.0 | 164.0 | -31.1 | 22.62 | -4.58 | 54.88 | 62.64 | 684.8 | 848.8 | -560.1 | -753.8 | 724.1 | 722.7 |
| 95 | 30.382 | 30.293 | 401.2 | 363.7 | 364.1 | 361.1 | 168.6 | -43.5 | 24.85 | -8.88 | 57.29 | 65.07 | 673.8 | 856.8 | -566.8 | -776.8 | 735.4 | 733.3 |

STA-1 STA-2
---LOCAL---

| %SPAN | INCS | INCH | DEGREE | DEGREE | TURN | CAMBER | OMEGA-B | D-FAC | OMEGA-B | LOSS-P | PO2/ | EFF-P | EFF-AD | EFF-P | M-1 | M-2 | M*-1 | M*-2 |
|-------|--------|--------|--------|--------|-------|--------|---------|--------|---------|--------|--------|-------|--------|---------|------|------|------|------|
| | | | | | | | | | | | | | | | | | | |
| 5 | -10.87 | -7.94 | 12.35 | 35.10 | 55.89 | 0.000 | 1694 | 0.126 | 0.280 | 0.280 | 0.9792 | 0.000 | 0.000 | -6887 | 5398 | 5303 | 4613 | 7063 |
| 10 | -10.46 | -7.53 | 10.14 | 36.18 | 53.87 | 0.000 | 1554 | 0.0702 | 0.179 | 0.179 | 0.9884 | 0.000 | 0.000 | 98.2276 | 5071 | 5117 | 4511 | 7068 |
| 15 | -11.02 | -8.08 | 8.83 | 35.83 | 52.51 | 0.000 | 1476 | 0.051 | 0.134 | 0.134 | 0.9922 | 0.000 | 0.000 | 2.1859 | 4864 | 4949 | 4367 | 7067 |
| 30 | -13.10 | -10.09 | 8.16 | 32.60 | 50.68 | 0.000 | 1466 | 0.582 | 0.163 | 0.163 | 0.9922 | 0.000 | 0.000 | 2.9746 | 4556 | 4616 | 4903 | 7116 |
| 50 | -15.19 | -12.06 | 8.11 | 29.60 | 49.61 | 0.000 | 1493 | 0.537 | 0.164 | 0.164 | 0.9938 | 0.000 | 0.000 | 3.3221 | 4184 | 4222 | 5393 | 7242 |
| 70 | -17.66 | -14.42 | 7.85 | 27.73 | 49.91 | 0.000 | 1786 | 0.626 | 0.207 | 0.207 | 0.9936 | 0.000 | 0.000 | -83498 | 3945 | 3854 | 5850 | 7469 |
| 85 | -18.28 | -14.97 | 10.93 | 26.02 | 52.00 | 0.000 | 2338 | 1.079 | 0.376 | 0.376 | 0.9870 | 0.000 | 0.000 | 3339 | 3937 | 3619 | 6160 | 7566 |
| 90 | -16.87 | -13.54 | 12.82 | 27.19 | 53.55 | 0.000 | 2457 | 0.781 | 0.277 | 0.277 | 0.9926 | 0.000 | 0.000 | 5370 | 3805 | 3481 | 6105 | 7550 |
| 95 | -14.90 | -11.53 | 12.81 | 31.73 | 56.02 | 0.000 | 2842 | 0.574 | 0.205 | 0.205 | 0.9952 | 0.000 | 0.000 | 7011 | 3575 | 3228 | 5992 | 7601 |

STA-1 STA-2
---LOCAL---

10.0 11.0

TABLE 6.2

BLADE-ELEMENT AND OVERALL PERFORMANCE WITH UNIFORM INLET
50 PERCENT OF DESIGN SPEED

Rotor

| %SPAN | DIA-1 | DIA-2 | V-1 | V-2 | VM-1 | VM-2 | VO-1 | VO-2 | B-1 | B-2 | B-1-1 | B-1-2 | V-1-1 | V-1-2 | VO-1-1 | VO-1-2 | U-1 | U-2 |
|-------|--------|--------|-------|-------|-------|-------|------|-------|-----|-------|-------|-------|-------|-------|--------|--------|-------|-------|
| 5 | 17.467 | 19.769 | 269.8 | 559.2 | 269.8 | 417.9 | 0 | 371.6 | 0 | 41.64 | 57.47 | 14.41 | 501.9 | 431.5 | 423.1 | 107.3 | 423.1 | 478.9 |
| 10 | 18.467 | 20.408 | 275.4 | 522.7 | 275.4 | 391.3 | 0 | 346.6 | 0 | 41.52 | 58.38 | 20.70 | 525.3 | 418.8 | 447.4 | 117.8 | 447.4 | 494.4 |
| 15 | 19.467 | 21.047 | 280.2 | 496.6 | 280.2 | 378.2 | 0 | 321.8 | 0 | 40.38 | 59.29 | 26.39 | 548.5 | 422.8 | 471.6 | 128.1 | 471.6 | 509.9 |
| 30 | 22.314 | 22.964 | 289.9 | 460.3 | 289.9 | 373.1 | 0 | 269.5 | 0 | 35.83 | 61.79 | 37.49 | 613.4 | 471.0 | 540.6 | 158.6 | 540.6 | 556.3 |
| 50 | 25.791 | 25.520 | 293.4 | 416.8 | 293.4 | 353.9 | 0 | 220.1 | 0 | 31.87 | 64.84 | 48.32 | 690.3 | 533.0 | 624.8 | 198.1 | 624.8 | 618.2 |
| 70 | 28.954 | 28.076 | 288.5 | 378.5 | 288.5 | 331.7 | 0 | 182.4 | 0 | 28.80 | 67.64 | 56.32 | 758.4 | 598.2 | 701.4 | 247.8 | 701.4 | 680.1 |
| 85 | 31.295 | 29.973 | 280.2 | 364.7 | 280.2 | 318.8 | 0 | 177.3 | 0 | 29.08 | 69.71 | 59.87 | 808.3 | 635.1 | 758.1 | 254.9 | 758.1 | 726.6 |
| 90 | 31.883 | 30.630 | 277.7 | 352.4 | 277.7 | 300.6 | 0 | 183.9 | 0 | 31.46 | 70.23 | 61.70 | 820.8 | 634.0 | 772.4 | 258.2 | 772.4 | 742.0 |
| 95 | 32.499 | 31.271 | 275.2 | 328.6 | 275.2 | 271.8 | 0 | 184.8 | 0 | 34.22 | 70.73 | 64.62 | 834.0 | 634.0 | 787.3 | 257.8 | 787.3 | 757.5 |

| %SPAN | INCS | INCM | DEV | TURN | CAMBER | OMEGA-B | D-FAC | OMEGA-B | LOSS-P | LOSS-P | PO2/ | EFF-P | EFF-AD | EFF-P | M-1 | M-2 | M-1-1 | M-1-2 |
|-------|------|------|-------|-------|--------|---------|--------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 5 | 2.10 | 8.54 | 12.54 | 43.06 | 47.12 | 0.000 | 0.3129 | 0.0539 | 0.0115 | 1.2062 | 0.9643 | 0.9633 | 0.9633 | 0.9633 | 0.2440 | 0.4990 | 0.4557 | 0.3851 |
| 10 | 2.44 | 8.77 | 10.98 | 37.69 | 39.90 | 0.000 | 0.3622 | 0.1214 | 0.0261 | 1.1857 | 0.9701 | 0.9671 | 0.9671 | 0.9671 | 0.2495 | 0.4655 | 0.4759 | 0.3729 |
| 15 | 2.81 | 8.57 | 9.88 | 32.89 | 34.02 | 0.000 | 0.3757 | 0.1332 | 0.0287 | 1.1727 | 0.8668 | 0.8641 | 0.8641 | 0.8641 | 0.2537 | 0.4419 | 0.5016 | 0.3762 |
| 30 | 3.95 | 7.90 | 7.76 | 24.31 | 24.18 | 0.000 | 0.3522 | 0.2004 | 0.0193 | 1.1589 | 0.8966 | 0.8942 | 0.8942 | 0.8942 | 0.2619 | 0.4093 | 0.5586 | 0.4188 |
| 50 | 5.30 | 7.92 | 16.52 | 14.69 | 14.69 | 0.001 | 0.3246 | 0.0821 | 0.0166 | 1.1393 | 0.8115 | 0.8688 | 0.8115 | 0.8688 | 0.2644 | 0.3703 | 0.6286 | 0.4735 |
| 70 | 6.17 | 7.98 | 5.81 | 11.32 | 9.14 | 0.000 | 0.2913 | 0.0813 | 0.0152 | 1.1209 | 0.8349 | 0.8319 | 0.7855 | 0.8319 | 0.2598 | 0.3361 | 0.6853 | 0.5312 |
| 85 | 6.36 | 7.61 | 5.73 | 9.84 | 7.99 | 0.000 | 0.2920 | 0.1074 | 0.0195 | 1.1145 | 0.7842 | 0.7601 | 0.7054 | 0.7601 | 0.2530 | 0.3234 | 0.7257 | 0.5631 |
| 90 | 6.38 | 7.47 | 6.56 | 8.53 | 7.62 | 0.000 | 0.3086 | 0.1450 | 0.0254 | 1.1092 | 0.6702 | 0.6851 | 0.6313 | 0.6851 | 0.2504 | 0.3118 | 0.7384 | 0.5611 |
| 95 | 6.52 | 7.43 | 8.75 | 6.12 | 7.44 | 0.000 | 0.3214 | 0.1780 | 0.0287 | 1.0997 | 0.6176 | 0.6118 | 0.5738 | 0.6118 | 0.2481 | 0.2903 | 0.7504 | 0.5601 |

TO/TO PO/PO EFF-AD EFF-P
INLET INLET INLET INLET

Stator

1.0458 1.1421 84.55 84.86

| %SPAN | DIA-1 | DIA-2 | V-1 | V-2 | VM-1 | VM-2 | VO-1 | VO-2 | B-1 | B-2 | B-1-1 | B-1-2 | V-1-1 | V-1-2 | VO-1-1 | VO-1-2 | U-1 | U-2 |
|-------|--------|--------|-------|-------|-------|-------|-------|------|-------|-----|-------|-------|-------|-------|--------|--------|-------|-------|
| 5 | 20.409 | 21.489 | 594.7 | 553.7 | 473.4 | 553.6 | 359.9 | 5.8 | 37.24 | 60 | 15.86 | 42.92 | 492.2 | 756.0 | 134.5 | 514.8 | 474.4 | 520.6 |
| 10 | 21.008 | 21.961 | 558.4 | 531.6 | 445.5 | 531.6 | 336.7 | 7.8 | 37.07 | 66 | 21.14 | 45.44 | 478.0 | 757.8 | 172.3 | 538.9 | 508.9 | 532.0 |
| 15 | 21.589 | 22.432 | 533.3 | 515.0 | 431.4 | 514.6 | 313.5 | 10.6 | 35.99 | 72 | 25.88 | 47.51 | 479.9 | 762.1 | 209.5 | 561.9 | 523.0 | 548.4 |
| 30 | 23.314 | 23.902 | 498.5 | 483.9 | 422.0 | 483.2 | 265.1 | 26.3 | 32.12 | 83 | 35.33 | 51.40 | 518.0 | 774.7 | 279.7 | 605.4 | 564.8 | 578.0 |
| 50 | 25.601 | 25.893 | 459.3 | 445.3 | 403.6 | 444.0 | 219.0 | 33.2 | 28.47 | 94 | 44.79 | 56.08 | 559.3 | 796.0 | 401.2 | 660.4 | 620.2 | 627.3 |
| 70 | 27.818 | 27.902 | 431.4 | 408.7 | 390.2 | 406.5 | 184.1 | 42.4 | 25.27 | 105 | 51.45 | 60.49 | 626.2 | 825.4 | 489.8 | 718.3 | 673.9 | 678.9 |
| 85 | 29.408 | 29.382 | 429.9 | 385.9 | 389.6 | 385.0 | 181.7 | 47.2 | 25.01 | 116 | 53.72 | 62.48 | 658.3 | 833.3 | 530.7 | 739.0 | 712.4 | 711.8 |
| 90 | 29.914 | 29.856 | 423.4 | 374.1 | 379.0 | 373.6 | 188.8 | 49.1 | 26.49 | 127 | 54.73 | 63.29 | 656.4 | 831.1 | 535.9 | 742.4 | 724.7 | 723.3 |
| 95 | 30.382 | 30.293 | 409.8 | 352.9 | 362.9 | 351.4 | 190.4 | 52.4 | 27.68 | 138 | 56.37 | 65.37 | 655.3 | 843.0 | 545.6 | 766.3 | 736.0 | 733.9 |

| %SPAN | INCS | INCM | DEV | TURN | CAMBER | OMEGA-B | D-FAC | OMEGA-B | LOSS-P | LOSS-P | PO2/ | EFF-P | EFF-AD | EFF-P | M-1 | M-2 | M-1-1 | M-1-2 |
|-------|-------|-------|-------|-------|--------|---------|--------|---------|--------|--------|--------|-------|--------|--------|--------|--------|--------|--------|
| 5 | 8.58 | 5.66 | 13.01 | 36.65 | 55.89 | 0.000 | 0.2131 | 0.1123 | 0.0379 | 0.279 | 0.9803 | 0.000 | 0.000 | 0.2453 | 0.5240 | 0.4939 | 0.4346 | 0.6744 |
| 10 | 8.27 | 5.33 | 10.59 | 37.93 | 53.87 | 0.000 | 0.2020 | 0.0707 | 0.0180 | 0.180 | 0.9889 | 0.000 | 0.000 | 0.3788 | 0.4908 | 0.4740 | 0.4260 | 0.6756 |
| 15 | 8.58 | 5.63 | 8.94 | 38.07 | 52.50 | 0.000 | 0.1944 | 0.0447 | 0.0117 | 0.117 | 0.9936 | 0.000 | 0.000 | 0.4722 | 0.4590 | 0.4722 | 0.4306 | 0.6792 |
| 30 | 10.50 | 7.50 | 8.10 | 35.25 | 50.68 | 0.000 | 0.1916 | 0.0408 | 0.0115 | 0.115 | 0.9948 | 0.000 | 0.000 | 0.4121 | 0.4415 | 0.4312 | 0.4656 | 0.6903 |
| 50 | 12.35 | 9.22 | 7.76 | 32.76 | 49.60 | 0.000 | 0.1779 | 0.0352 | 0.0108 | 0.108 | 0.9962 | 0.000 | 0.000 | 0.5190 | 0.4073 | 0.3955 | 0.5108 | 0.7088 |
| 70 | 14.41 | 11.16 | 7.54 | 31.22 | 49.90 | 0.000 | 0.2265 | 0.0373 | 0.0123 | 0.123 | 0.9964 | 0.000 | 0.000 | 0.6139 | 0.3823 | 0.3636 | 0.5601 | 0.7344 |
| 85 | 14.28 | 10.96 | 11.87 | 29.05 | 51.99 | 0.000 | 0.2722 | 0.0753 | 0.0263 | 0.263 | 0.9928 | 0.000 | 0.000 | 0.6139 | 0.3823 | 0.3636 | 0.5601 | 0.7344 |
| 90 | 12.95 | 9.62 | 14.47 | 29.42 | 53.53 | 0.000 | 0.2712 | 0.0736 | 0.0261 | 0.261 | 0.9931 | 0.000 | 0.000 | 0.6799 | 0.3760 | 0.3314 | 0.5833 | 0.7364 |
| 95 | 12.03 | 8.66 | 14.41 | 32.96 | 56.00 | 0.000 | 0.3353 | 0.0813 | 0.0292 | 0.292 | 0.9729 | 0.000 | 0.000 | 0.7043 | 0.3641 | 0.3121 | 0.5816 | 0.7457 |

STA-1 STA-2

---LOCAL---

10.0 11.0

BLADE-ELEMENT AND OVERALL PERFORMANCE WITH UNIFORM INLET 50 PERCENT OF DESIGN SPEED

Rotor

| %SPAN IN | DIA-1 IN | DIA-2 IN | V-1 FT/SEC | V-2 FT/SEC | VM-1 FT/SEC | VM-2 FT/SEC | VO-1 FT/SEC | VO-2 FT/SEC | B-1 DEGREE | B-2 DEGREE | B*-1 DEGREE | B*-2 DEGREE | V*-1 FT/SEC | V*-2 FT/SEC | VO*-1 FT/SEC | VO*-2 FT/SEC | U-1 FT/SEC | U-2 FT/SEC |
|----------|----------|----------|------------|------------|-------------|-------------|-------------|-------------|------------|------------|-------------|-------------|-------------|-------------|--------------|--------------|------------|------------|
| 5 | 17.467 | 19.769 | 258.9 | 550.7 | 258.9 | 398.3 | 0 | 380.3 | 0.00 | 43.67 | 58.53 | 13.09 | 495.9 | 410.4 | 423.0 | 140.5 | 423.0 | 498.6 |
| 10 | 18.467 | 20.408 | 264.2 | 516.9 | 264.2 | 376.6 | 0 | 354.1 | 0.00 | 43.22 | 57.43 | 20.42 | 519.4 | 402.4 | 417.4 | 130.2 | 402.4 | 498.6 |
| 15 | 19.467 | 21.047 | 268.8 | 487.8 | 268.8 | 362.5 | 0 | 326.2 | 0.00 | 41.96 | 60.31 | 26.77 | 542.7 | 406.9 | 411.4 | 123.5 | 406.9 | 509.7 |
| 20 | 20.467 | 21.686 | 273.4 | 458.7 | 273.4 | 350.3 | 0 | 298.3 | 0.00 | 38.35 | 62.78 | 37.98 | 607.7 | 449.0 | 410.4 | 116.5 | 410.4 | 556.1 |
| 30 | 22.314 | 22.964 | 277.9 | 450.7 | 277.9 | 353.3 | 0 | 278.8 | 0.00 | 35.47 | 65.77 | 48.49 | 684.9 | 506.3 | 424.6 | 109.2 | 506.3 | 618.0 |
| 50 | 25.791 | 25.520 | 281.0 | 411.4 | 281.0 | 335.0 | 0 | 238.8 | 0.00 | 32.40 | 68.50 | 56.34 | 753.7 | 574.3 | 478.9 | 92.9 | 574.3 | 679.9 |
| 70 | 28.954 | 28.076 | 276.2 | 376.9 | 276.2 | 318.2 | 0 | 201.9 | 0.00 | 34.14 | 70.50 | 60.31 | 803.0 | 603.1 | 523.8 | 85.4 | 603.1 | 726.4 |
| 85 | 31.295 | 29.993 | 268.3 | 340.9 | 268.3 | 298.7 | 0 | 202.5 | 0.00 | 36.60 | 70.99 | 62.31 | 816.7 | 602.8 | 533.7 | 77.1 | 816.7 | 741.8 |
| 90 | 31.883 | 30.630 | 265.9 | 348.9 | 265.9 | 280.1 | 0 | 208.0 | 0.00 | 38.18 | 71.48 | 64.19 | 830.0 | 609.4 | 548.6 | 78.1 | 830.0 | 757.3 |
| 95 | 32.449 | 31.271 | 263.6 | 337.6 | 263.6 | 265.4 | 0 | 208.7 | 0.00 | 38.18 | 71.48 | 64.19 | 830.0 | 609.4 | 548.6 | 78.1 | 830.0 | 757.3 |
| %SPAN | INCS | INCM | DEV | TURN | CAMBER | OMEGA-B | D-FAC | OMEGA-B | LOSS-P | LOSS-P | PO2/ | PO1 | EFF-P | EFF-P | EFF-P | M*-1 | M*-2 | M*-2 |
| 5 | 3.16 | 9.59 | 12.02 | 44.64 | 47.12 | 0.000 | 0.3515 | 0.387 | 0.083 | 0.083 | 1.2140 | 0.9754 | 0.9747 | 0.9317 | 0.2339 | 0.4908 | 0.4502 | 0.3657 |
| 10 | 3.48 | 9.81 | 10.70 | 39.01 | 39.89 | 0.000 | 0.3900 | 0.086 | 0.173 | 0.173 | 1.1599 | 0.9357 | 0.9340 | 0.8556 | 0.2392 | 0.4599 | 0.4745 | 0.3580 |
| 15 | 3.84 | 9.59 | 10.30 | 33.52 | 34.04 | 0.000 | 0.4003 | 0.1027 | 0.220 | 0.220 | 1.1813 | 0.9157 | 0.9136 | 0.8355 | 0.2433 | 0.4335 | 0.4963 | 0.3616 |
| 30 | 4.94 | 8.89 | 8.25 | 24.80 | 24.18 | 0.001 | 0.3888 | 0.048 | 0.180 | 0.180 | 1.1574 | 0.9081 | 0.9059 | 0.8484 | 0.2509 | 0.4001 | 0.5544 | 0.3987 |
| 50 | 6.22 | 8.85 | 6.24 | 17.28 | 14.69 | 0.003 | 0.3666 | 0.0710 | 0.184 | 0.184 | 1.1513 | 0.8701 | 0.8672 | 0.8159 | 0.2531 | 0.3648 | 0.6213 | 0.4888 |
| 70 | 7.03 | 8.84 | 5.83 | 12.15 | 9.14 | 0.002 | 0.3272 | 0.0850 | 0.159 | 0.159 | 1.1362 | 0.8422 | 0.8422 | 0.7997 | 0.2487 | 0.3339 | 0.8059 | 0.5089 |
| 85 | 7.15 | 8.41 | 6.17 | 10.20 | 7.99 | 0.001 | 0.3392 | 0.1287 | 0.231 | 0.231 | 1.1295 | 0.7535 | 0.7488 | 0.6972 | 0.2422 | 0.3190 | 0.7214 | 0.5331 |
| 90 | 7.15 | 8.24 | 7.16 | 8.69 | 7.61 | 0.001 | 0.3540 | 0.1627 | 0.279 | 0.279 | 1.1246 | 0.6936 | 0.6880 | 0.6383 | 0.2398 | 0.3079 | 0.7340 | 0.5319 |
| 95 | 7.27 | 8.18 | 8.31 | 7.30 | 7.43 | 0.001 | 0.3584 | 0.1814 | 0.297 | 0.297 | 1.1205 | 0.6566 | 0.6505 | 0.6059 | 0.2376 | 0.2976 | 0.7462 | 0.5371 |

STA-1 STA-2
---LOCAL---

TO/TO PO/PO EFF-AD EFF-P
INLET INLET INLET INLET

1.0492 1.1544 85.27 85.59

Stator

| %SPAN IN | DIA-1 IN | DIA-2 IN | V-1 FT/SEC | V-2 FT/SEC | VM-1 FT/SEC | VM-2 FT/SEC | VO-1 FT/SEC | VO-2 FT/SEC | B-1 DEGREE | B-2 DEGREE | B*-1 DEGREE | B*-2 DEGREE | V*-1 FT/SEC | V*-2 FT/SEC | VO*-1 FT/SEC | VO*-2 FT/SEC | U-1 FT/SEC | U-2 FT/SEC |
|----------|----------|----------|------------|------------|-------------|-------------|-------------|-------------|------------|------------|-------------|-------------|-------------|-------------|--------------|--------------|------------|------------|
| 5 | 20.409 | 21.489 | 582.0 | 521.7 | 450.6 | 521.7 | 368.4 | 58.9 | 39.26 | 39.26 | 15.61 | 45.26 | 467.9 | 741.1 | 125.9 | 526.4 | 494.3 | 530.4 |
| 10 | 21.008 | 21.961 | 548.4 | 498.3 | 427.1 | 498.3 | 343.9 | 50.6 | 38.83 | 38.83 | 15.61 | 45.26 | 458.3 | 735.6 | 125.9 | 526.4 | 502.8 | 531.8 |
| 15 | 21.589 | 22.432 | 520.3 | 480.8 | 412.0 | 480.8 | 317.7 | 48.6 | 37.62 | 37.62 | 15.61 | 45.26 | 430.6 | 735.6 | 125.9 | 526.4 | 502.8 | 531.8 |
| 30 | 23.314 | 23.902 | 485.0 | 453.6 | 393.3 | 453.6 | 275.3 | 44.5 | 34.58 | 34.58 | 15.61 | 45.26 | 403.4 | 735.6 | 125.9 | 526.4 | 502.8 | 531.8 |
| 50 | 25.601 | 25.893 | 449.9 | 419.7 | 381.9 | 419.7 | 237.7 | 40.6 | 31.89 | 31.89 | 15.61 | 45.26 | 376.9 | 735.6 | 125.9 | 526.4 | 502.8 | 531.8 |
| 70 | 27.818 | 27.902 | 425.1 | 387.8 | 373.0 | 387.8 | 204.0 | 37.2 | 28.68 | 28.68 | 15.61 | 45.26 | 350.6 | 735.6 | 125.9 | 526.4 | 502.8 | 531.8 |
| 85 | 29.408 | 29.382 | 421.0 | 365.8 | 366.3 | 365.8 | 207.5 | 34.2 | 25.53 | 25.53 | 15.61 | 45.26 | 324.1 | 735.6 | 125.9 | 526.4 | 502.8 | 531.8 |
| 90 | 29.914 | 29.856 | 415.3 | 353.1 | 356.1 | 352.8 | 213.7 | 31.2 | 22.97 | 22.97 | 15.61 | 45.26 | 297.6 | 735.6 | 125.9 | 526.4 | 502.8 | 531.8 |
| 95 | 30.382 | 30.293 | 410.7 | 340.2 | 350.0 | 339.6 | 215.0 | 28.3 | 20.57 | 20.57 | 15.61 | 45.26 | 270.4 | 735.6 | 125.9 | 526.4 | 502.8 | 531.8 |
| %SPAN | INCS | INCM | DEV | TURN | CAMBER | OMEGA-B | D-FAC | OMEGA-B | LOSS-P | LOSS-P | PO2/ | PO1 | EFF-P | EFF-P | EFF-P | M*-1 | M*-2 | M*-2 |
| 5 | -6.62 | -3.70 | 11.76 | 39.92 | 55.89 | 0.000 | 0.2596 | 0.167 | 0.290 | 0.290 | 0.803 | 0.000 | 0.000 | 0.4652 | 0.5128 | 0.4638 | 0.4134 | 0.6888 |
| 10 | -6.53 | -3.59 | 10.22 | 40.06 | 53.87 | 0.000 | 0.2529 | 0.093 | 0.231 | 0.231 | 0.863 | 0.000 | 0.000 | 0.5865 | 0.4807 | 0.428 | 0.4078 | 0.6546 |
| 15 | -6.99 | -4.04 | 8.78 | 39.85 | 52.50 | 0.000 | 0.2420 | 0.056 | 0.148 | 0.148 | 0.922 | 0.000 | 0.000 | 0.7013 | 0.4597 | 0.4273 | 0.4129 | 0.6570 |
| 30 | -7.63 | -4.93 | 8.12 | 37.67 | 50.68 | 0.000 | 0.2363 | 0.030 | 0.098 | 0.098 | 0.9958 | 0.000 | 0.000 | 0.7701 | 0.4293 | 0.4029 | 0.418 | 0.702 |
| 50 | -8.91 | -5.77 | 7.99 | 35.94 | 49.60 | 0.000 | 0.2483 | 0.028 | 0.082 | 0.082 | 0.9972 | 0.000 | 0.000 | 0.8439 | 0.3984 | 0.3724 | 0.4835 | 0.610 |
| 70 | -10.93 | -7.69 | 7.98 | 34.20 | 49.90 | 0.000 | 0.2756 | 0.024 | 0.080 | 0.080 | 0.9977 | 0.000 | 0.000 | 0.8425 | 0.3776 | 0.3439 | 0.5344 | 0.7189 |
| 85 | -9.79 | -6.47 | 13.06 | 32.38 | 52.00 | 0.000 | 0.3187 | 0.037 | 0.187 | 0.187 | 0.9951 | 0.000 | 0.000 | 0.7781 | 0.3731 | 0.3233 | 0.5531 | 0.7215 |
| 90 | -8.48 | -5.15 | 15.26 | 31.11 | 53.53 | 0.000 | 0.3439 | 0.018 | 0.219 | 0.219 | 0.9945 | 0.000 | 0.000 | 0.7865 | 0.3678 | 0.316 | 0.5516 | 0.7285 |
| 95 | -8.11 | -4.74 | 16.44 | 34.82 | 56.00 | 0.000 | 0.3777 | 0.082 | 0.281 | 0.281 | 0.9932 | 0.000 | 0.000 | 0.7663 | 0.3637 | 0.299 | 0.5551 | 0.7281 |

STA-1 STA-2
---LOCAL---

10.0 11.0

NCORR WCORR TO/TO PO/PO EFF-AD EFF-P WCI/AI
INLET INLET INLET INLET INLET
RPM LBM/SEC & SQFT
5550. 88.84 1.0492 1.1488 82.30 82.67 19.94

TABLE 6.4

BLADE-ELEMENT AND OVERALL PERFORMANCE WITH UNIFORM INLET 50 PERCENT OF DESIGN SPEED

Rotor

| %SPAN | DIA-1 IN | DIA-2 IN | V-1 FT/SEC | V-2 FT/SEC | VM-1 FT/SEC | VM-2 FT/SEC | VO-1 FT/SEC | VO-2 FT/SEC | B-2 DEGREE | B-1 DEGREE | B-2 DEGREE | B-1 DEGREE | V ⁰ -1 FT/SEC | V ⁰ -2 FT/SEC | VO ⁰ -1 FT/SEC | VO ⁰ -2 FT/SEC | U-1 FT/SEC | U-2 FT/SEC |
|-------|-------------|-------------|---------------|---------------|----------------|----------------|----------------|----------------|---------------|---------------|---------------|---------------|-----------------------------|-----------------------------|------------------------------|------------------------------|---------------|---------------|
| 5 | 17.467 | 19.769 | 246.4 | 539.8 | 246.4 | 374.6 | 0 | 388.7 | 0.00 | 46.06 | 59.74 | 13.44 | 489.1 | 385.2 | 422.5 | 489.5 | 422.5 | 489.5 |
| 10 | 18.467 | 20.408 | 251.5 | 508.4 | 251.5 | 357.0 | 0 | 361.8 | 0.00 | 45.37 | 60.62 | 20.24 | 512.6 | 381.7 | 446.7 | 512.6 | 446.7 | 512.6 |
| 15 | 19.467 | 21.047 | 255.9 | 481.6 | 255.9 | 347.3 | 0 | 333.5 | 0.00 | 43.82 | 61.48 | 28.55 | 535.9 | 389.7 | 470.9 | 535.9 | 470.9 | 535.9 |
| 30 | 22.314 | 22.964 | 264.5 | 442.0 | 264.5 | 333.2 | 0 | 290.4 | 0.00 | 41.06 | 63.88 | 38.44 | 601.1 | 426.1 | 539.7 | 601.1 | 539.7 | 601.1 |
| 50 | 25.791 | 25.520 | 267.4 | 406.6 | 267.4 | 320.0 | 0 | 250.8 | 0.00 | 38.08 | 66.79 | 48.83 | 678.7 | 486.7 | 623.8 | 678.7 | 623.8 | 678.7 |
| 70 | 28.954 | 28.076 | 262.4 | 377.6 | 262.4 | 305.9 | 0 | 221.6 | 0.00 | 35.00 | 69.46 | 56.24 | 747.9 | 550.6 | 700.3 | 747.9 | 700.3 | 747.9 |
| 85 | 31.295 | 29.993 | 254.4 | 355.5 | 254.4 | 271.8 | 0 | 203.3 | 0.00 | 40.13 | 71.42 | 61.29 | 798.6 | 565.9 | 756.9 | 798.6 | 756.9 | 798.6 |
| 90 | 31.883 | 30.630 | 252.2 | 352.0 | 252.2 | 261.8 | 0 | 235.3 | 0.00 | 41.55 | 71.89 | 62.63 | 811.4 | 569.4 | 771.2 | 811.4 | 771.2 | 811.4 |
| 95 | 32.499 | 31.271 | 250.0 | 341.5 | 250.0 | 247.5 | 0 | 235.3 | 0.00 | 43.55 | 72.36 | 64.59 | 824.9 | 576.9 | 786.1 | 824.9 | 786.1 | 824.9 |

| %SPAN | INCS | INCH | DEV | TURN | CAMBER | OMEGA-B | D-FAC | OMEGA-B | LOSS-P | LOSS-P | PO2/ | EFF-P | EFF-P | EFF-P | M-1 | M-2 | M-1 | M-2 |
|-------|------|-------|-------|-------|--------|---------|--------|---------|--------|--------|--------|-------|-------|-------|--------|--------|--------|--------|
| 5 | 4.37 | 10.80 | 11.57 | 44.30 | 47.12 | 0.000 | 0.399 | 0.421 | 0.090 | 0.070 | 1.2185 | 9.745 | 9.737 | 9.734 | 0.225 | 0.450 | 0.436 | 0.427 |
| 10 | 4.66 | 11.00 | 10.52 | 40.38 | 39.89 | 0.000 | 0.421 | 0.471 | 0.168 | 0.168 | 1.2028 | 9.466 | 9.452 | 9.448 | 0.226 | 0.451 | 0.467 | 0.479 |
| 15 | 4.99 | 10.75 | 10.25 | 34.73 | 34.03 | 0.001 | 0.4283 | 0.471 | 0.170 | 0.170 | 1.1902 | 9.779 | 9.362 | 8.806 | 0.2315 | 0.4276 | 0.4899 | 0.460 |
| 30 | 6.04 | 9.98 | 8.71 | 25.44 | 24.18 | 0.004 | 0.4230 | 0.812 | 0.171 | 0.171 | 1.1757 | 9.167 | 9.146 | 8.661 | 0.2387 | 0.3918 | 0.5483 | 0.3778 |
| 50 | 7.24 | 9.87 | 6.58 | 17.97 | 14.69 | 0.007 | 0.3949 | 0.827 | 0.166 | 0.166 | 1.1629 | 8.892 | 8.866 | 8.436 | 0.2406 | 0.3599 | 0.6156 | 0.4309 |
| 70 | 7.99 | 9.79 | 5.76 | 13.22 | 9.17 | 0.005 | 0.3623 | 0.701 | 0.169 | 0.169 | 1.1510 | 8.519 | 8.487 | 8.068 | 0.2359 | 0.3340 | 0.6759 | 0.4869 |
| 85 | 8.07 | 9.32 | 7.18 | 10.13 | 8.02 | 0.002 | 0.3930 | 0.1608 | 0.280 | 0.280 | 1.1418 | 7.230 | 7.230 | 6.717 | 0.2294 | 0.3132 | 0.7166 | 0.4986 |
| 90 | 8.05 | 9.14 | 7.50 | 9.36 | 7.63 | 0.002 | 0.4031 | 0.180 | 0.315 | 0.315 | 1.1409 | 6.915 | 6.852 | 6.323 | 0.2272 | 0.3097 | 0.7292 | 0.509 |
| 95 | 8.14 | 9.06 | 8.72 | 7.77 | 7.44 | 0.003 | 0.4057 | 0.2022 | 0.326 | 0.326 | 1.1373 | 6.616 | 6.549 | 6.054 | 0.2252 | 0.3002 | 0.7412 | 0.5070 |

TO/TO PO/PO EFF-AD EFF-P
INLET INLET INLET INLET
1.0523 1.1659 85.74 86.07

Stator

| %SPAN | DIA-1 IN | DIA-2 IN | V-1 FT/SEC | V-2 FT/SEC | VM-1 FT/SEC | VM-2 FT/SEC | VO-1 FT/SEC | VO-2 FT/SEC | B-2 DEGREE | B-1 DEGREE | B-2 DEGREE | B-1 DEGREE | V ⁰ -1 FT/SEC | V ⁰ -2 FT/SEC | VO ⁰ -1 FT/SEC | VO ⁰ -2 FT/SEC | U-1 FT/SEC | U-2 FT/SEC |
|-------|----------------|-------------|---------------|----------------|------------------|------------------|----------------|------------------|-----------------|-------------------|---------------|----------------|-----------------------------|-----------------------------|------------------------------|------------------------------|---------------|---------------|
| 5 | 20.409 | 21.489 | 566.4 | 490.5 | 423.2 | 490.5 | 376.5 | -5 | 41.66 | -06 | 15.48 | 46.69 | 439.1 | 715.0 | 117.2 | 520.3 | 493.6 | 519.8 |
| 10 | 21.008 | 21.961 | 535.1 | 466.2 | 403.5 | 466.2 | 351.4 | -6.1 | 41.04 | -05 | 15.48 | 46.69 | 439.1 | 715.0 | 117.2 | 520.3 | 503.1 | 531.2 |
| 15 | 21.589 | 22.432 | 509.2 | 447.7 | 392.1 | 447.7 | 324.9 | -7.9 | 39.62 | -1.01 | 26.68 | 50.88 | 439.4 | 709.6 | 197.3 | 550.5 | 525.2 | 542.6 |
| 30 | 23.314 | 23.902 | 471.7 | 423.6 | 375.2 | 423.5 | 285.9 | -6.8 | 37.29 | -8.2 | 36.49 | 54.08 | 467.3 | 722.3 | 178.0 | 584.9 | 561.2 | 578.3 |
| 50 | 25.601 | 25.893 | 440.3 | 394.4 | 362.5 | 394.4 | 249.8 | -16.5 | 34.56 | -2.41 | 45.50 | 58.47 | 517.8 | 754.1 | 1369.4 | 642.8 | 616.2 | 626.3 |
| 70 | 27.818 | 27.902 | 420.0 | 366.3 | 355.4 | 365.1 | 223.8 | -29.7 | 32.21 | -4.64 | 51.64 | 62.61 | 572.7 | 793.6 | 449.0 | 704.5 | 672.8 | 674.9 |
| 85 | 29.408 | 29.382 | 409.9 | 343.3 | 336.1 | 343.1 | 204.6 | -8.7 | 30.91 | -1.44 | 54.81 | 64.50 | 583.3 | 777.0 | 476.7 | 719.4 | 711.3 | 710.7 |
| 90 | 29.914 | 29.856 | 410.1 | 334.5 | 331.4 | 334.5 | 241.5 | 4.2 | 36.08 | 7.1 | 55.49 | 65.02 | 585.0 | 792.1 | 482.0 | 718.0 | 723.5 | 722.1 |
| 95 | 30.382 | 30.293 | 405.5 | 322.1 | 325.1 | 322.1 | 242.4 | -8 | 36.71 | -1.4 | 56.57 | 66.29 | 590.1 | 801.1 | 492.4 | 733.5 | 734.9 | 732.1 |
| %SPAN | INCS DEGREE | INCH | DEV DEGREE | TURN DEGREE | CAMBER DEGREE | OMEGA-B SHOCK | D-FAC | OMEGA-B TOTAL | LOSS-P TOTAL | LOSS-P PROFILE | P02/ P01 | EFF-P TOTAL | EFF-AD TOTAL | EFF-P STATIC | M-1 | M-2 | M-1 | M-2 |
| 5 | -4.22 | -1.30 | 12.35 | 41.72 | 55.89 | .2953 | | .1151 | .0286 | .0286 | .9816 | .0000 | .0000 | .5832 | .4980 | .4347 | .3872 | .6337 |
| 10 | -4.42 | -1.49 | 10.69 | 41.79 | 53.87 | .2955 | | .1001 | .0255 | .0255 | .9856 | .0000 | .0000 | .5722 | .4688 | .4131 | .3664 | .6303 |
| 15 | -4.97 | -2.03 | 10.00 | 40.84 | 54.50 | .2885 | | .0807 | .0211 | .0211 | .9894 | .0000 | .0000 | .7070 | .4493 | .3967 | .3934 | .6287 |
| 30 | -5.19 | -2.19 | 10.30 | 38.22 | 50.68 | .2741 | | .0434 | .0122 | .0122 | .9951 | .0000 | .0000 | .8051 | .4172 | .3751 | .4175 | .6356 |
| 50 | -6.19 | -3.06 | 9.63 | 36.98 | 49.61 | .2885 | | .0350 | .0107 | .0107 | .9955 | .0000 | .0000 | .8453 | .3997 | .3490 | .4617 | .6612 |
| 70 | -7.38 | -4.14 | 8.85 | 36.85 | 47.91 | .0000 | | .3276 | .0373 | .0123 | .9966 | .0000 | .0000 | .8373 | .3720 | .3237 | .5081 | .7013 |
| 85 | -8.49 | -1.18 | 14.47 | 36.35 | 52.01 | .0000 | | .3701 | .0461 | .0161 | .9960 | .0000 | .0000 | .8499 | .3523 | .3022 | .5156 | .7017 |
| 90 | -3.40 | -0.07 | 16.11 | 35.37 | 53.54 | .0000 | | .3902 | .0248 | .0161 | .9940 | .0000 | .0000 | .8621 | .3221 | .2940 | .5164 | .6962 |
| -2.67 | .39 | 19.55 | 36.86 | 56.00 | .0000 | .4223 | | .0872 | .0315 | .0315 | .9926 | .0000 | .0000 | .7780 | .3579 | .2928 | .5101 | .7033 |

NCORR WCORR TO/TO PO/PO EFF-AD EFF-P WCI/A1
INLET INLET INLET INLET
5543. 84.69 1.0523 1.1591 82.43 82.83 19.01
%SPAN 5 10 15 30 50 70 85 90 95

STA-1 STA-2
---LOCAL---
10.0 11.0

BLADE-ELEMENT AND OVERALL PERFORMANCE WITH UNIFORM INLET
50 PERCENT OF DESIGN SPEED

Rotor

| DIA-1 | DIA-2 | V-1 | V-2 | VM-1 | VM-2 | VO-1 | VO-2 | B-1 | B-2 | B-1-1 | B-2-2 | V-1-1 | V-2-2 | VO-1-1 | VO-2-2 | U-1 | U-2 |
|--------|--------|--------|--------|--------|---------|--------|---------|--------|---------|--------|--------|--------|--------|--------|--------|--------|--------|
| IN | IN | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | DEGREE | DEGREE | DEGREE | DEGREE | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC |
| 17.467 | 19.769 | 234.7 | 527.6 | 234.7 | 531.4 | 0 | 393.5 | 0 | 48.23 | 60.88 | 13.37 | 48.24 | 361.2 | 421.5 | -83.5 | 421.5 | 477.0 |
| 18.467 | 20.408 | 239.5 | 501.3 | 239.5 | 343.1 | 0 | 365.4 | 0 | 46.79 | 61.74 | 20.28 | 505.9 | 366.3 | 445.6 | -127.0 | 445.6 | 492.4 |
| 19.467 | 21.047 | 243.8 | 477.4 | 243.8 | 337.5 | 0 | 337.6 | 0 | 45.00 | 62.57 | 26.73 | 529.2 | 378.5 | 469.7 | -170.3 | 469.7 | 507.8 |
| 22.314 | 22.964 | 252.0 | 434.1 | 252.0 | 315.9 | 0 | 297.7 | 0 | 43.30 | 64.92 | 38.99 | 574.5 | 407.2 | 538.4 | -250.4 | 538.4 | 554.1 |
| 25.791 | 25.520 | 254.2 | 402.0 | 254.2 | 304.5 | 0 | 265.5 | 0 | 40.76 | 67.78 | 49.20 | 672.2 | 466.6 | 622.3 | -353.3 | 622.3 | 615.1 |
| 28.954 | 28.076 | 248.8 | 376.6 | 248.8 | 287.7 | 0 | 242.9 | 0 | 40.18 | 70.40 | 56.48 | 741.6 | 521.3 | 698.6 | -434.5 | 698.6 | 677.5 |
| 31.295 | 29.993 | 241.0 | 355.4 | 241.0 | 250.0 | 0 | 252.5 | 0 | 45.28 | 72.30 | 62.05 | 792.6 | 533.4 | 755.1 | -471.2 | 755.1 | 723.7 |
| 31.883 | 30.430 | 238.9 | 356.3 | 238.9 | 245.5 | 0 | 258.3 | 0 | 46.45 | 72.75 | 62.95 | 805.5 | 539.9 | 769.3 | -480.6 | 769.3 | 739.1 |
| 32.499 | 31.271 | 236.8 | 348.4 | 236.8 | 234.2 | 0 | 257.9 | 0 | 47.76 | 73.20 | 64.75 | 816.2 | 549.1 | 784.2 | -496.6 | 784.2 | 754.5 |
| INCS | INCM | DEV | TURN | CAMBER | OMEGA-B | D-FAC | OMEGA-B | LOSS-P | LOSS-P | PO2/ | EFF-P | EFF-AD | EFF-P | M-1 | M-2 | M-1 | M-2 |
| DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | SHOCK | | | TOTAL | PROFILE | P01 | TOTAL | STATIC | | | | | |
| 5.50 | 11.93 | 11.50 | 47.51 | 47.12 | .0001 | 4415 | .0401 | .0086 | .0066 | 1.2214 | .3765 | .9435 | .2118 | .4688 | .4372 | .3210 | .3210 |
| 5.77 | 12.11 | 10.56 | 41.46 | 39.90 | .0002 | 4504 | .0464 | .0100 | .0100 | 1.2097 | .9691 | .9682 | .2167 | .4450 | .4615 | .3252 | .3252 |
| 6.08 | 11.82 | 10.24 | 35.84 | 34.04 | .0004 | 4441 | .0401 | .0086 | .0085 | 1.1993 | .9695 | .9687 | .2205 | .4236 | .4839 | .3358 | .3358 |
| 7.09 | 11.01 | 9.25 | 25.93 | 24.17 | .0011 | 4518 | .0402 | .0147 | .0145 | 1.1831 | .9310 | .9293 | .2272 | .3844 | .5439 | .3606 | .3606 |
| 8.24 | 10.85 | 6.96 | 18.58 | 14.69 | .0014 | 4243 | .0300 | .0159 | .0157 | 1.1725 | .8990 | .8966 | .2285 | .3554 | .6102 | .4126 | .4126 |
| 8.94 | 10.72 | 6.03 | 13.92 | 9.19 | .0010 | 4061 | .0295 | .0204 | .0202 | 1.1629 | .8374 | .8336 | .2234 | .3323 | .6707 | .4600 | .4600 |
| 8.95 | 10.20 | 7.95 | 10.25 | 8.03 | .0005 | 4399 | .0127 | .0310 | .0309 | 1.1549 | .7216 | .7155 | .2171 | .3123 | .7112 | .4688 | .4688 |
| 8.91 | 10.00 | 7.83 | 9.80 | 7.64 | .0005 | 4457 | .0212 | .0337 | .0337 | 1.1563 | .6974 | .6946 | .2151 | .3128 | .7229 | .4739 | .4739 |
| 8.98 | 9.90 | 8.88 | 8.45 | 7.44 | .0006 | 4456 | .02137 | .0342 | .0341 | 1.1540 | .6754 | .6683 | .2132 | .3055 | .7357 | .4815 | .4815 |

TO/TO PO/PO EFF-AD EFF-P
INLET INLET INLET INLET

STA-1 STA-2
--LOCAL--

Stator

8.0 9.0

| DIA-1 | DIA-2 | V-1 | V-2 | VM-1 | VM-2 | VO-1 | VO-2 | B-1 | B-2 | B-1-1 | B-2-2 | V-1-1 | V-2-2 | VO-1-1 | VO-2-2 | U-1 | U-2 |
|--------|--------|--------|--------|--------|---------|--------|---------|--------|---------|--------|--------|--------|--------|--------|--------|--------|--------|
| IN | IN | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | DEGREE | DEGREE | DEGREE | DEGREE | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC |
| 20.409 | 21.489 | 550.7 | 461.9 | 397.5 | 461.9 | 381.2 | 1.8 | 43.80 | .23 | 15.64 | 48.20 | 412.8 | 693.1 | -111.3 | -516.7 | 492.5 | 518.5 |
| 21.008 | 21.961 | 524.5 | 439.5 | 386.2 | 439.5 | 354.8 | -5.2 | 42.56 | -0.9 | 21.48 | 50.91 | 415.4 | 692.6 | -152.1 | -535.1 | 506.9 | 529.9 |
| 21.589 | 22.432 | 501.3 | 421.0 | 378.4 | 420.9 | 338.8 | -8.3 | 40.98 | -1.3 | 26.89 | 52.55 | 424.7 | 692.4 | -172.1 | -543.6 | 520.9 | 541.3 |
| 23.314 | 23.902 | 460.4 | 397.2 | 355.0 | 397.1 | 273.2 | -6.9 | 39.55 | -1.01 | 37.15 | 55.76 | 445.9 | 705.1 | -269.4 | -583.7 | 562.5 | 576.7 |
| 25.601 | 25.893 | 431.9 | 370.6 | 343.7 | 369.9 | 261.6 | -21.9 | 37.28 | -3.00 | 45.98 | 60.22 | 495.1 | 745.1 | -356.1 | -646.7 | 617.7 | 634.6 |
| 27.818 | 27.902 | 414.5 | 345.1 | 333.9 | 344.2 | 245.5 | -25.2 | 36.33 | -4.18 | 51.89 | 63.77 | 541.9 | 778.7 | -425.7 | -698.5 | 671.2 | 673.3 |
| 29.408 | 29.382 | 404.3 | 322.9 | 310.9 | 322.9 | 258.5 | -2.9 | 37.73 | -0.52 | 55.42 | 65.60 | 547.9 | 781.7 | -451.1 | -711.9 | 704.0 | 704.0 |
| 29.914 | 29.856 | 407.9 | 319.2 | 310.0 | 319.1 | 265.1 | 8.2 | 40.54 | 1.47 | 55.84 | 65.87 | 552.0 | 780.4 | -456.7 | -711.2 | 721.8 | 720.4 |
| 30.382 | 30.293 | 404.8 | 309.9 | 305.4 | 309.6 | 265.7 | 12.8 | 41.02 | 2.37 | 56.84 | 66.68 | 558.4 | 782.0 | -467.4 | -711.2 | 733.1 | 730.9 |
| INCS | INCM | DEV | TURN | CAMBER | OMEGA-B | D-FAC | OMEGA-B | LOSS-P | LOSS-P | PO2/ | EFF-P | EFF-AD | EFF-P | M-1 | M-2 | M-1 | M-2 |
| DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | SHOCK | | | TOTAL | PROFILE | P01 | TOTAL | STATIC | | | | | |
| -2.16 | .77 | 12.64 | 43.57 | 55.90 | .0000 | 3381 | .1113 | .0277 | .0277 | .9831 | .0000 | .0000 | .4842 | .4084 | .3645 | .6128 | .6128 |
| -3.05 | -.12 | 10.75 | 43.25 | 53.87 | .0000 | 3334 | .1086 | .0277 | .0277 | .9849 | .0000 | .0000 | .4600 | .3866 | .3719 | .6124 | .6124 |
| -3.51 | -.57 | 9.68 | 42.11 | 52.51 | .0000 | 3328 | .1004 | .0263 | .0263 | .9872 | .0000 | .0000 | .4420 | .3722 | .3722 | .6121 | .6121 |
| -2.91 | .09 | 10.22 | 40.55 | 50.68 | .0000 | 3181 | .0498 | .0140 | .0140 | .9946 | .0000 | .0000 | .4070 | .3597 | .3974 | .6238 | .6238 |
| -3.43 | -.30 | 8.64 | 40.67 | 49.61 | .0000 | 3422 | .0440 | .0135 | .0135 | .9958 | .0000 | .0000 | .3821 | .3270 | .4398 | .6575 | .6575 |
| -3.32 | -.08 | 9.31 | 40.52 | 49.92 | .0000 | 3383 | .0488 | .0161 | .0161 | .9957 | .0000 | .0000 | .3665 | .3040 | .4786 | .6859 | .6859 |
| -.29 | 3.60 | 15.39 | 40.25 | 52.02 | .0000 | 4274 | .0608 | .0212 | .0212 | .9949 | .0000 | .0000 | .3562 | .2833 | .4828 | .6858 | .6858 |
| 1.04 | 4.37 | 18.87 | 39.07 | 53.54 | .0000 | 4414 | .0837 | .0297 | .0297 | .9929 | .0000 | .0000 | .3593 | .2797 | .4858 | .6837 | .6837 |
| 1.34 | 4.71 | 22.06 | 38.65 | 56.00 | .0000 | 4602 | .0992 | .0357 | .0357 | .9917 | .0000 | .0000 | .3563 | .2712 | .4907 | .6845 | .6845 |

NCORR NCORR TO/TO PO/PO EFF-AD EFF-P WCI/VI
INLET INLET INLET INLET

STA-1 STA-2
--LOCAL--

RPM LBM/SEC 5530. 80.68 1.0551 1.1682 82.52 82.93 10.11

10.0 11.0

TABLE 6.6

BLADE-ELEMENT AND OVERALL PERFORMANCE WITH UNIFORM INLET
50 PERCENT OF DESIGN SPEED

Rotor

118

| %SPAN | DIA-1 IN | DIA-2 IN | V-1 FT/SEC | V-2 FT/SEC | VH-1 FT/SEC | VH-2 FT/SEC | VO-1 FT/SEC | VO-2 FT/SEC | B-1 DEGREE | B-2 DEGREE | B*-1 DEGREE | B*-2 DEGREE | V*-1 FT/SEC | V*-2 FT/SEC | VO*-1 FT/SEC | VO*-2 FT/SEC | U-1 FT/SEC | U-2 FT/SEC |
|-------|-------------|-------------|---------------|---------------|----------------|----------------|----------------|----------------|---------------|---------------|----------------|----------------|----------------|----------------|-----------------|-----------------|---------------|---------------|
| 5 | 17.467 | 19.769 | 222.6 | 525.6 | 222.6 | 337.5 | .0 | 403.0 | .00 | 50.05 | 62.22 | 12.61 | 477.8 | 345.9 | -422.7 | -75.5 | 422.7 | 478.4 |
| 10 | 18.467 | 20.408 | 227.2 | 500.3 | 227.2 | 330.1 | .0 | 376.0 | .00 | 48.70 | 63.05 | 19.62 | 501.4 | 351.0 | -446.9 | -117.9 | 446.9 | 493.9 |
| 15 | 19.467 | 21.047 | 231.2 | 477.4 | 231.2 | 325.0 | .0 | 349.6 | .00 | 47.07 | 63.85 | 26.13 | 524.8 | 362.7 | -471.1 | -159.8 | 471.1 | 509.4 |
| 30 | 22.314 | 22.964 | 238.7 | 432.9 | 238.7 | 300.5 | .0 | 311.6 | .00 | 46.04 | 66.15 | 39.01 | 590.4 | 387.6 | -540.0 | -244.1 | 540.0 | 555.7 |
| 50 | 25.791 | 25.520 | 240.0 | 401.7 | 240.0 | 287.0 | .0 | 281.1 | .00 | 44.40 | 68.96 | 49.49 | 568.7 | 442.6 | -624.2 | -336.9 | 624.2 | 617.4 |
| 70 | 28.954 | 28.076 | 234.3 | 377.8 | 234.3 | 262.7 | .0 | 271.5 | .00 | 45.95 | 71.51 | 57.21 | 738.9 | 483.3 | -700.7 | -407.9 | 700.7 | 679.5 |
| 85 | 31.295 | 29.993 | 227.0 | 372.1 | 227.0 | 239.7 | .0 | 284.6 | .00 | 49.90 | 73.31 | 61.49 | 790.7 | 503.1 | -757.4 | -441.2 | 757.4 | 725.9 |
| 90 | 31.883 | 30.630 | 225.0 | 374.1 | 225.0 | 236.3 | .0 | 289.9 | .00 | 50.82 | 73.74 | 62.36 | 803.7 | 505.5 | -771.6 | -451.3 | 771.6 | 741.3 |
| 95 | 32.499 | 31.271 | 223.0 | 363.3 | 223.0 | 219.5 | .0 | 289.6 | .00 | 52.64 | 74.17 | 64.84 | 817.5 | 516.2 | -786.5 | -467.2 | 786.5 | 756.8 |

| %SPAN | INCS DEGREE | INCM DEGREE | DEV DEGREE | TURN DEGREE | CARBER DEGREE | OMEGA-B SHOCK | D-FAC OMEGA-B | LOSS-P TOTAL | LOSS-P PROFILE | P02/ TOTAL | EFF-P TOTAL | EFF-AD TOTAL | EFF-P STATIC | M*-1 | M*-2 |
|-------|----------------|----------------|---------------|----------------|------------------|------------------|------------------|-----------------|-------------------|---------------|----------------|-----------------|-----------------|-------|-------|
| 5 | 6.84 | 13.27 | 10.73 | 49.62 | 47.12 | .0007 | .4728 | .0486 | .0104 | .0103 | 1.2269 | .9728 | .9358 | .2009 | .4666 |
| 10 | 7.08 | 13.41 | 9.90 | 43.43 | 39.89 | .0010 | .4812 | .0534 | .0116 | .0114 | 1.2162 | .9661 | .9651 | .2055 | .4438 |
| 15 | 7.37 | 13.08 | 9.71 | 37.73 | 34.11 | .0014 | .4753 | .0481 | .0104 | .0101 | 1.2065 | .9654 | .9644 | .2092 | .4405 |
| 30 | 8.34 | 12.24 | 9.27 | 27.13 | 24.15 | .0026 | .4878 | .0871 | .0182 | .0177 | 1.1901 | .9194 | .9172 | .2152 | .3828 |
| 50 | 9.44 | 12.04 | 7.27 | 19.47 | 14.69 | .0039 | .4655 | .1067 | .0211 | .0206 | 1.1807 | .8754 | .8722 | .2156 | .3545 |
| 70 | 10.04 | 11.82 | 6.78 | 14.29 | 9.20 | .0021 | .4655 | .1565 | .0286 | .0282 | 1.1731 | .7925 | .7874 | .2103 | .3324 |
| 85 | 9.97 | 11.22 | 7.38 | 11.82 | 8.03 | .0012 | .4925 | .2125 | .0367 | .0365 | 1.1737 | .7125 | .7057 | .2045 | .3261 |
| 90 | 9.91 | 10.99 | 7.24 | 11.38 | 7.64 | .0011 | .4965 | .2280 | .0390 | .0388 | 1.1761 | .6945 | .6872 | .2025 | .3275 |
| 95 | 9.96 | 10.87 | 8.97 | 9.33 | 7.44 | .0013 | .4989 | .2434 | .0389 | .0387 | 1.1729 | .6700 | .6623 | .2007 | .3177 |

To/To PO/PO EFF-AD EFF-P
INLET INLET INLET INLET
1.0596 1.1865 84.09 84.49

Stator

| %SPAN | DIA-1 IN | DIA-2 IN | V-1 FT/SEC | V-2 FT/SEC | VH-1 FT/SEC | VH-2 FT/SEC | VO-1 FT/SEC | VO-2 FT/SEC | B-1 DEGREE | B-2 DEGREE | B*-1 DEGREE | B*-2 DEGREE | V*-1 FT/SEC | V*-2 FT/SEC | VO*-1 FT/SEC | VO*-2 FT/SEC | U-1 FT/SEC | U-2 FT/SEC |
|-------|-------------|-------------|---------------|---------------|----------------|----------------|----------------|----------------|---------------|---------------|----------------|----------------|----------------|----------------|-----------------|-----------------|---------------|---------------|
| 5 | 20.409 | 21.489 | 545.5 | 436.2 | 381.0 | 436.2 | 390.3 | 5.5 | 45.69 | .72 | 15.21 | 49.71 | 394.9 | 674.5 | -103.6 | -514.5 | 493.9 | 520.1 |
| 10 | 21.008 | 21.961 | 520.3 | 414.3 | 370.6 | 414.2 | 365.1 | -6.6 | 44.56 | -.93 | 21.12 | 52.41 | 397.7 | 679.2 | -143.3 | -538.1 | 508.4 | 531.5 |
| 15 | 21.589 | 22.432 | 498.0 | 395.4 | 363.2 | 395.2 | 340.6 | -11.7 | 43.15 | -1.70 | 26.57 | 54.52 | 406.6 | 681.1 | -181.9 | -554.5 | 522.5 | 542.9 |
| 30 | 23.314 | 23.902 | 455.8 | 370.5 | 337.0 | 370.3 | 306.9 | -12.2 | 42.32 | -1.89 | 37.11 | 57.91 | 424.4 | 697.2 | -257.3 | -590.6 | 668.2 | 578.4 |
| 50 | 25.601 | 25.893 | 428.3 | 347.5 | 323.9 | 347.1 | 280.3 | -17.1 | 40.87 | -2.82 | 46.30 | 61.65 | 469.3 | 731.4 | -339.3 | -643.7 | 619.6 | 626.4 |
| 70 | 27.818 | 27.902 | 411.9 | 323.0 | 307.1 | 322.2 | 274.5 | -22.1 | 41.79 | -3.92 | 52.39 | 65.20 | 503.3 | 768.3 | -398.7 | -697.4 | 673.2 | 675.3 |
| 85 | 29.408 | 29.382 | 415.1 | 308.0 | 295.7 | 308.0 | 291.4 | .4 | 44.58 | .07 | 54.88 | 66.57 | 513.9 | 774.6 | -420.3 | -710.7 | 711.1 | 711.1 |
| 90 | 29.914 | 29.856 | 419.0 | 308.1 | 294.9 | 307.9 | 297.7 | 9.5 | 45.27 | 1.77 | 55.33 | 66.64 | 518.3 | 776.7 | -426.3 | -713.0 | 723.9 | 722.5 |
| 95 | 30.382 | 30.293 | 413.3 | 300.9 | 286.1 | 300.5 | 298.3 | 14.2 | 46.19 | 2.72 | 56.78 | 67.31 | 522.4 | 779.2 | -437.0 | -718.9 | 735.3 | 733.1 |

| %SPAN | INCS DEGREE | INCM DEGREE | DEV DEGREE | TURN DEGREE | CARBER DEGREE | OMEGA-B SHOCK | D-FAC OMEGA-B | LOSS-P TOTAL | LOSS-P PROFILE | P02/ TOTAL | EFF-P TOTAL | EFF-AD TOTAL | EFF-P STATIC | M*-1 | M*-2 |
|-------|----------------|----------------|---------------|----------------|------------------|------------------|------------------|-----------------|-------------------|---------------|----------------|-----------------|-----------------|-------|-------|
| 5 | -.30 | 2.63 | 13.13 | 44.97 | 55.89 | .0000 | .3711 | .1152 | .0286 | .0286 | .9829 | .0000 | .0000 | .4793 | .3847 |
| 10 | -1.00 | 1.94 | 10.51 | 45.50 | 53.87 | .0000 | .3820 | .1144 | .0292 | .0292 | .9844 | .0000 | .0000 | .4565 | .3654 |
| 15 | -1.31 | 1.63 | 9.31 | 44.85 | 52.51 | .0000 | .3876 | .1105 | .0289 | .0289 | .9861 | .0000 | .0000 | .4389 | .3486 |
| 30 | -.11 | 2.88 | 9.33 | 44.20 | 50.67 | .0000 | .3814 | .0608 | .0171 | .0171 | .9935 | .0000 | .0000 | .4029 | .3264 |
| 50 | .18 | 3.30 | 9.22 | 43.69 | 49.61 | .0000 | .4001 | .0440 | .0135 | .0135 | .9959 | .0000 | .0000 | .3785 | .3057 |
| 70 | 2.07 | 5.31 | 9.56 | 45.72 | 49.92 | .0000 | .4542 | .0572 | .0189 | .0189 | .9950 | .0000 | .0000 | .3631 | .2833 |
| 85 | 5.12 | 8.43 | 15.98 | 44.51 | 52.01 | .0004 | .5031 | .1168 | .0409 | .0409 | .9877 | .0000 | .0000 | .3634 | .2691 |
| 90 | 5.70 | 9.03 | 19.17 | 43.50 | 53.54 | .0005 | .5094 | .1305 | .0463 | .0462 | .9884 | .0000 | .0000 | .3683 | .2688 |
| 95 | 6.48 | 9.84 | 22.40 | 43.47 | 56.00 | .0003 | .5202 | .1295 | .0466 | .0465 | .9888 | .0000 | .0000 | .3629 | .2623 |

NCORR WCORR To/To PO/PO EFF-AD EFF-P WCI/A1
INLET INLET INLET INLET INLET LBM/SEC
RPM LBM/SEC
5546. 76.49 1.0596 1.1768 79.95 80.43 17.17

STA-1 STA-2
---LOCAL---
8.0 9.0 10.0 11.0

BLADE-ELEMENT AND OVERALL PERFORMANCE WITH UNIFORM INLET 70 PERCENT OF DESIGN SPEED

Rotor

| %SPAN | DIA-1 | DIA-2 | V-1 | V-2 | VM-1 | VM-2 | VO-1 | VO-2 | B-1 | B-2 | B-1 | B-2 | VS-1 | VS-2 | VO-1 | VO-2 | U-1 | U-2 |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|--------|--------|--------|
| | IN | IN | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | DEGREE | DEGREE | DEGREE | DEGREE | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC |
| 5 | 17.467 | 19.769 | 408.2 | 781.4 | 408.2 | 794.7 | .0 | 506.8 | .00 | 40.44 | 55.37 | 15.25 | 718.3 | 616.5 | -591.0 | -162.1 | 591.0 | 688.9 |
| 10 | 18.467 | 20.408 | 417.1 | 735.7 | 417.1 | 763.4 | .0 | 473.1 | .00 | 40.02 | 56.28 | 21.10 | 751.3 | 604.4 | -624.9 | -217.4 | 624.9 | 690.5 |
| 15 | 19.467 | 21.047 | 424.9 | 701.8 | 424.9 | 746.6 | .0 | 439.8 | .00 | 38.79 | 57.18 | 26.44 | 783.9 | 611.4 | -658.7 | -272.4 | 658.7 | 712.2 |
| 30 | 22.314 | 22.964 | 441.2 | 653.7 | 441.2 | 740.6 | .0 | 367.4 | .00 | 34.19 | 59.70 | 37.10 | 874.5 | 678.8 | -755.0 | -409.6 | 755.0 | 777.0 |
| 50 | 25.771 | 25.520 | 447.8 | 596.0 | 447.8 | 715.5 | .0 | 298.9 | .00 | 30.09 | 62.83 | 47.56 | 980.9 | 765.0 | -872.7 | -564.6 | 872.7 | 863.5 |
| 70 | 28.954 | 28.076 | 440.2 | 541.2 | 440.2 | 682.0 | .0 | 246.1 | .00 | 27.04 | 65.80 | 55.59 | 1074.1 | 853.2 | -979.7 | -703.9 | 979.7 | 950.0 |
| 85 | 31.295 | 29.993 | 426.8 | 523.3 | 426.8 | 666.1 | .0 | 237.9 | .00 | 27.04 | 68.04 | 59.04 | 1141.7 | 906.1 | -1058.9 | -777.0 | 1058.9 | 1014.9 |
| 90 | 31.883 | 30.630 | 422.7 | 506.9 | 422.7 | 642.5 | .0 | 247.1 | .00 | 29.19 | 68.60 | 60.73 | 1158.7 | 905.0 | -1078.8 | -789.4 | 1078.8 | 1036.4 |
| 95 | 32.499 | 31.271 | 418.9 | 484.0 | 418.9 | 626.5 | .0 | 256.6 | .00 | 33.59 | 69.15 | 64.26 | 1176.8 | 889.9 | -1099.7 | -801.5 | 1099.7 | 1058.1 |

| %SPAN | INCS | INCM | DEV | TURN | CAMBER | OMEGA-B | D-FAC | OMEGA-B | LOSS-P | PO2/ | EFF-P | EFF-AD | EFF-P | M-1 | M-2 | M-1 | M-2 |
|-------|--------|--------|--------|--------|--------|---------|-------|---------|--------|---------|--------|--------|--------|-------|-------|-------|-------|
| | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | SHOCK | | | TOTAL | PROFILE | PO1 | TOTAL | STATIC | | | | |
| 5 | -0.1 | 6.42 | 13.38 | 40.12 | 47.12 | .0002 | .3063 | .0622 | .0132 | .0131 | 1.4141 | .9582 | .9561 | .8872 | .3717 | .6960 | .6565 |
| 10 | .32 | 6.67 | 11.41 | 35.18 | 39.93 | .0005 | .3477 | .1208 | .0259 | .0258 | 1.3734 | .9091 | .9049 | .8040 | .3808 | .6530 | .6906 |
| 15 | .69 | 6.48 | 9.91 | 30.73 | 34.00 | .0009 | .3600 | .1320 | .0284 | .0282 | 1.3467 | .8881 | .8833 | .7888 | .3880 | .6218 | .7215 |
| 30 | 1.84 | 5.80 | 7.38 | 22.60 | 24.19 | .0028 | .3386 | .0892 | .0192 | .0196 | 1.3177 | .8995 | .8955 | .8387 | .4023 | .5788 | .6040 |
| 50 | 3.30 | 5.92 | 5.30 | 15.27 | 14.68 | .0048 | .3126 | .0826 | .0170 | .0160 | 1.2759 | .8750 | .8706 | .8291 | .4073 | .5270 | .6983 |
| 70 | 4.35 | 6.15 | 5.08 | 10.21 | 9.13 | .0054 | .2819 | .0874 | .0167 | .0157 | 1.2343 | .8310 | .8260 | .7936 | .4000 | .4780 | .7536 |
| 85 | 4.68 | 5.93 | 4.91 | 9.00 | 8.00 | .0055 | .2802 | .1142 | .0213 | .0203 | 1.2209 | .7639 | .7572 | .7189 | .3887 | .4610 | .7994 |
| 90 | 4.76 | 5.84 | 5.61 | 7.87 | 7.63 | .0062 | .2960 | .1557 | .0281 | .0270 | 1.2075 | .6878 | .6793 | .6438 | .3843 | .4442 | .7944 |
| 95 | 4.93 | 5.84 | 8.40 | 4.89 | 7.45 | .0078 | .3240 | .2171 | .0354 | .0341 | 1.1827 | .5736 | .5633 | .5537 | .3807 | .4050 | .7768 |

STA-1 STA-2
---LOCAL---

8.0 9.0

Stator

| %SPAN | DIA-1 | DIA-2 | V-1 | V-2 | VM-1 | VM-2 | VO-1 | VO-2 | B-1 | B-2 | B-1 | B-2 | VS-1 | VS-2 | VO-1 | VO-2 | U-1 | U-2 |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|--------|--------|
| | IN | IN | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | DEGREE | DEGREE | DEGREE | DEGREE | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC |
| 5 | 20.409 | 21.489 | 842.4 | 820.7 | 844.6 | 820.6 | 490.9 | -11.5 | 35.65 | -8.0 | 16.26 | 41.99 | 713.1 | 1104.0 | -199.7 | -738.6 | 690.6 | 727.1 |
| 10 | 21.008 | 21.961 | 797.7 | 795.2 | 811.8 | 794.5 | 459.8 | -32.7 | 35.19 | -24.36 | 21.06 | 44.31 | 698.9 | 1110.6 | -251.0 | -775.8 | 710.8 | 743.1 |
| 15 | 21.589 | 22.432 | 765.4 | 777.0 | 834.1 | 775.8 | 428.6 | -44.3 | 34.04 | -34.27 | 25.44 | 46.00 | 702.8 | 1116.9 | -301.9 | -803.4 | 730.5 | 759.0 |
| 30 | 23.314 | 23.902 | 720.4 | 739.2 | 822.9 | 737.8 | 361.6 | -30.12 | 34.61 | -34.61 | 34.41 | 49.22 | 755.8 | 1129.7 | -427.3 | -855.3 | 788.9 | 808.8 |
| 50 | 25.601 | 25.893 | 670.5 | 688.4 | 800.7 | 687.0 | 297.6 | -26.35 | 33.72 | -33.72 | 43.40 | 53.27 | 827.5 | 1149.0 | -568.6 | -920.8 | 866.3 | 876.1 |
| 70 | 27.618 | 27.902 | 632.9 | 632.9 | 821.1 | 631.1 | 248.4 | -23.11 | 23.11 | -4.39 | 49.96 | 57.55 | 905.0 | 1176.3 | -692.9 | -972.6 | 941.3 | 944.1 |
| 85 | 29.408 | 29.382 | 634.8 | 590.0 | 866.2 | 589.4 | 243.5 | -22.56 | 22.56 | -2.67 | 52.04 | 60.02 | 953.1 | 1179.5 | -751.5 | -1021.7 | 995.1 | 994.2 |
| 90 | 29.914 | 29.856 | 627.9 | 578.0 | 874.0 | 577.6 | 254.3 | -21.1 | 23.90 | -2.10 | 52.86 | 60.75 | 950.8 | 1182.2 | -757.9 | -1031.4 | 1012.2 | 1010.2 |
| 95 | 30.382 | 30.293 | 603.4 | 550.2 | 842.3 | 549.3 | 264.6 | -31.2 | 26.01 | -3.26 | 54.62 | 62.52 | 936.4 | 1190.6 | -763.5 | -1056.3 | 1028.0 | 1025.0 |

| %SPAN | INCS | INCM | DEV | TURN | CAMBER | OMEGA-B | D-FAC | OMEGA-B | LOSS-P | PO2/ | EFF-P | EFF-AD | EFF-P | M-1 | M-2 | M-1 | M-2 |
|-------|--------|--------|--------|--------|--------|---------|-------|---------|--------|---------|-------|--------|--------|---------|-------|-------|--------|
| | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | SHOCK | | | TOTAL | PROFILE | PO1 | TOTAL | STATIC | | | | |
| 5 | -10.30 | -7.37 | 11.61 | 36.45 | 55.89 | .0000 | .1704 | .1743 | .0433 | .0433 | .9450 | .0000 | .0000 | -1.7748 | .7461 | .7346 | .9883 |
| 10 | -10.17 | -7.23 | 9.08 | 37.56 | 53.86 | .0000 | .1576 | .1328 | .0339 | .0339 | .9618 | .0000 | .0000 | .0000 | .7052 | .7113 | .9934 |
| 15 | -10.51 | -7.57 | 7.70 | 37.31 | 52.46 | .0000 | .1439 | .0984 | .0257 | .0257 | .9736 | .0000 | .0000 | .0000 | .6798 | .6949 | .9988 |
| 30 | -12.45 | -9.45 | 7.61 | 33.74 | 50.68 | .0000 | .1313 | .0778 | .0218 | .0218 | .9811 | .0000 | .0000 | .0000 | .6396 | .6609 | 1.0100 |
| 50 | -14.45 | -11.32 | 8.32 | 30.07 | 49.60 | .0000 | .1289 | .0575 | .0206 | .0206 | .9855 | .0000 | .0000 | .0000 | .5952 | .6146 | 1.0258 |
| 70 | -16.58 | -13.33 | 9.10 | 27.50 | 49.90 | .0000 | .1553 | .0881 | .0291 | .0291 | .9829 | .0000 | .0000 | .0000 | .5637 | .5638 | 1.0477 |
| 85 | -16.77 | -13.46 | 13.24 | 25.23 | 52.00 | .0000 | .2198 | .1735 | .0606 | .0606 | .9662 | .0000 | .0000 | .0000 | .5226 | .5226 | 1.0447 |
| 90 | -15.56 | -12.23 | 15.30 | 26.00 | 53.55 | .0000 | .2354 | .1636 | .0581 | .0581 | .9689 | .0000 | .0000 | .0000 | .5103 | .5103 | 1.0436 |
| 95 | -13.76 | -10.40 | 16.43 | 29.26 | 56.01 | .0000 | .2650 | .1536 | .0553 | .0553 | .9730 | .0000 | .0000 | .0000 | .4835 | .4835 | 1.0463 |

STA-1 STA-2
---LOCAL---

10.0 11.0

BLADE-ELEMENT AND OVERALL PERFORMANCE WITH UNIFORM INLET
70 PERCENT OF DESIGN SPEED

120

| Stator | | | | | | | | | | | | | | | | | | | | | | | | |
|---------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| TO/TO PO/PO EFF-AD EFF-P | | | | | | | | | | | | | | | | | | | | | | | | |
| INLET INLET INLET INLET | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.0947 1.3104 84.00 85.37 | | | | | | | | | | | | | | | | | | | | | | | | |
| 8.0 9.0 | | | | | | | | | | | | | | | | | | | | | | | | |
| STA=1 STA=2 | | | | | | | | | | | | | | | | | | | | | | | | |
| ---LOCAL--- | | | | | | | | | | | | | | | | | | | | | | | | |
| 8.0 9.0 | | | | | | | | | | | | | | | | | | | | | | | | |
| STA=1 STA=2 | | | | | | | | | | | | | | | | | | | | | | | | |
| ---LOCAL--- | | | | | | | | | | | | | | | | | | | | | | | | |
| 10.0 11.0 | | | | | | | | | | | | | | | | | | | | | | | | |

TABLE 7.3

BLADE-ELEMENT AND OVER ALL PERFORMANCE WITH UNIFORM INLET
70 PERCENT OF DESIGN SPEED

Rotor

| %SPAN | DIA-1 IN | DIA-2 IN | V-1 FT/SEC | V-2 FT/SEC | VM-1 FT/SEC | VM-2 FT/SEC | VO-1 FT/SEC | VO-2 FT/SEC | B-1 DEGREE | B-2 DEGREE | B1-1 DEGREE | B1-2 DEGREE | V1-1 FT/SEC | V1-2 FT/SEC | VO1-1 FT/SEC | VO1-2 FT/SEC | U-1 FT/SEC | U-2 FT/SEC |
|-------|-------------|-------------|---------------|---------------|----------------|----------------|----------------|----------------|---------------|---------------|----------------|----------------|----------------|----------------|-----------------|-----------------|---------------|---------------|
| | | | | | | | | | | | | | | | | | | |
| 5 | 17.467 | 19.769 | 375.6 | 758.2 | 375.6 | 543.8 | .0 | 528.3 | .00 | 44.17 | 57.61 | 14.62 | 701.1 | 562.0 | -592.1 | -141.8 | 592.1 | 670.1 |
| 10 | 18.467 | 20.408 | 383.8 | 711.3 | 383.8 | 511.5 | .0 | 494.4 | .00 | 44.03 | 58.48 | 21.13 | 734.2 | 548.9 | -626.0 | -197.4 | 626.0 | 691.7 |
| 15 | 19.467 | 21.047 | 390.9 | 666.3 | 390.9 | 492.0 | .0 | 440.0 | .00 | 43.65 | 59.36 | 27.69 | 765.9 | 545.0 | -659.8 | -253.4 | 659.8 | 713.4 |
| 30 | 22.314 | 22.964 | 405.3 | 621.7 | 405.3 | 473.3 | .0 | 403.1 | .00 | 40.41 | 61.82 | 38.37 | 858.1 | 604.5 | -756.3 | -375.3 | 756.3 | 778.4 |
| 50 | 25.791 | 25.520 | 411.5 | 573.2 | 411.5 | 453.6 | .0 | 350.4 | .00 | 37.68 | 64.79 | 48.57 | 966.2 | 686.2 | -874.2 | -514.6 | 874.2 | 865.0 |
| 70 | 28.954 | 28.076 | 405.5 | 534.9 | 405.5 | 437.0 | .0 | 308.5 | .00 | 35.22 | 67.55 | 55.80 | 1061.9 | 777.6 | -981.4 | -643.2 | 981.4 | 951.7 |
| 85 | 31.295 | 29.993 | 393.8 | 522.5 | 393.8 | 415.9 | .0 | 316.3 | .00 | 37.25 | 69.63 | 59.29 | 1131.5 | 814.6 | -1050.8 | -700.4 | 1050.8 | 1016.6 |
| 90 | 31.883 | 30.630 | 390.2 | 510.3 | 390.2 | 391.4 | .0 | 327.4 | .00 | 39.92 | 70.14 | 61.16 | 1149.0 | 811.4 | -1058.7 | -710.8 | 1058.7 | 1038.2 |
| 95 | 32.499 | 31.271 | 386.7 | 491.3 | 386.7 | 364.5 | .0 | 329.3 | .00 | 42.10 | 70.66 | 63.48 | 1167.5 | 816.5 | -1101.6 | -730.6 | 1101.6 | 1060.0 |

| %SPAN | INCS | INCM | DEV | TURN | CAMBER | OMEGA-B | D-FAC | OMEGA-B | LOSS-P | LOSS-P | PO2/ | EFF-P | EFF-AD | EFF-P | M-1 | M-2 | M1-1 | M1-2 |
|-------|------|------|-------|-------|--------|---------|-------|---------|--------|--------|--------|-------|--------|-------|-------|-------|--------|-------|
| | | | | | | | | | | | | | | | | | | |
| 5 | 2.23 | 8.66 | 12.74 | 42.99 | 47.12 | .0014 | .3742 | .0071 | .0015 | .0012 | 1.4548 | .9949 | .9946 | .9886 | .3413 | .6716 | .6392 | .4980 |
| 10 | 2.52 | 8.87 | 11.46 | 37.36 | 39.94 | .0021 | .4151 | .0684 | .0117 | .0142 | 1.4153 | .9529 | .9505 | .9059 | .3497 | .6282 | .6737 | .4847 |
| 15 | 2.86 | 8.66 | 11.16 | 31.66 | 34.00 | .0030 | .4391 | .1065 | .0227 | .0220 | 1.3790 | .9133 | .9133 | .8581 | .3561 | .5868 | .7045 | .4800 |
| 30 | 3.93 | 7.91 | 8.64 | 23.45 | 24.19 | .0059 | .4239 | .0878 | .0186 | .0173 | 1.3585 | .9125 | .9086 | .8704 | .3684 | .5464 | .7858 | .5312 |
| 50 | 5.21 | 7.85 | 6.29 | 16.22 | 14.66 | .0085 | .3998 | .0913 | .0184 | .0167 | 1.3329 | .8843 | .8794 | .8491 | .3734 | .5023 | .8803 | .6013 |
| 70 | 6.08 | 7.90 | 5.24 | 11.75 | 9.09 | .0087 | .3645 | .0916 | .0174 | .0158 | 1.3114 | .8599 | .8543 | .8294 | .3679 | .4679 | .7640 | .6802 |
| 85 | 6.27 | 7.53 | 5.13 | 10.34 | 7.97 | .0083 | .3792 | .1436 | .0266 | .0251 | 1.3058 | .7760 | .7573 | .7346 | .3581 | .4547 | 1.0214 | .7088 |
| 90 | 6.30 | 7.40 | 6.02 | 8.98 | 7.61 | .0090 | .3969 | .1840 | .0358 | .0312 | 1.2994 | .7201 | .7096 | .6775 | .3543 | .4424 | 1.0393 | .7035 |
| 95 | 6.44 | 7.36 | 7.60 | 7.18 | 7.42 | .0109 | .4045 | .2102 | .0352 | .0334 | 1.2875 | .6796 | .6690 | .6419 | .3508 | .4247 | 1.0563 | .7059 |

STA-1 STA-2
--LOCAL--

8.0 9.0

Stator

| %SPAN | DIA-1 IN | DIA-2 IN | V-1 FI/SEC | V-2 FI/SEC | VM-1 FI/SEC | VM-2 FI/SEC | VO-1 FT/SEC | VO-2 FT/SEC | B-1 DEGREE | B-2 DEGREE | B1-1 DEGREE | B1-2 DEGREE | V1-1 FT/SEC | V1-2 FT/SEC | VO1-1 FT/SEC | VO1-2 FT/SEC | U-1 FT/SEC | U-2 FT/SEC |
|-------|-------------|-------------|---------------|---------------|----------------|----------------|----------------|----------------|---------------|---------------|----------------|----------------|----------------|----------------|-----------------|-----------------|---------------|---------------|
| 5 | 20.409 | 21.489 | 802.1 | 688.5 | 511.7 | 3.8 | 39.64 | .32 | 16.25 | 46.46 | 643.3 | 999.5 | -180.0 | -724.6 | 691.8 | 728.4 | 728.4 | |
| 10 | 21.004 | 21.961 | 755.7 | 656.7 | 480.3 | -18.2 | 39.46 | -1.61 | 21.69 | 49.27 | 628.3 | 1006.6 | -231.8 | -762.6 | 712.1 | 744.4 | 744.4 | |
| 15 | 21.599 | 22.432 | 712.8 | 632.7 | 554.1 | 632.2 | 448.2 | -25.9 | 38.96 | 51.20 | 622.9 | 1009.0 | -283.5 | -786.2 | 731.8 | 760.3 | 760.3 | |
| 30 | 23.314 | 23.902 | 671.4 | 603.9 | 541.5 | 603.6 | 396.8 | -17.0 | 36.33 | 53.87 | 669.7 | 1024.1 | -393.4 | -827.1 | 790.2 | 810.2 | 810.2 | |
| 50 | 25.601 | 25.893 | 630.2 | 568.4 | 524.6 | 567.6 | 349.1 | -29.4 | 33.63 | 57.95 | 738.0 | 1070.1 | -518.7 | -907.0 | 867.8 | 877.7 | 877.7 | |
| 70 | 27.818 | 27.902 | 606.7 | 533.6 | 520.3 | 532.0 | 312.1 | -41.3 | 30.96 | 61.68 | 817.7 | 1121.3 | -630.8 | -987.0 | 942.9 | 945.9 | 945.9 | |
| 85 | 29.408 | 29.382 | 611.6 | 514.7 | 518.6 | 514.7 | 324.2 | -9.1 | 32.01 | 62.88 | 849.3 | 1129.2 | -672.6 | -1005.0 | 976.8 | 995.9 | 995.9 | |
| 90 | 29.914 | 29.956 | 607.6 | 498.6 | 505.8 | 498.6 | 336.7 | .3 | 33.65 | 63.76 | 845.3 | 1127.9 | -677.3 | -1011.7 | 1014.0 | 1012.0 | 1012.0 | |
| 95 | 30.382 | 30.293 | 599.0 | 481.0 | 493.6 | 490.9 | 339.3 | 5.8 | 34.50 | 64.78 | 848.8 | 1128.6 | -690.5 | -1021.0 | 1029.8 | 1026.8 | 1026.8 | |

| %SPAN | INCS | INCM | DEV | TURN | CAMBER | OMEGA-B | D-FAC | OMEGA-B | LOSS-P | LOSS-P | PO2/ | EFF-P | EFF-AD | EFF-P | M-1 | M-2 | M1-1 | M1-2 |
|-------|-------|-------|-------|-------|--------|---------|-------|---------|--------|--------|-------|-------|--------|-------|-------|-------|-------|-------|
| 5 | -6.13 | -3.21 | 12.73 | 39.33 | 55.90 | .0000 | .2950 | .1405 | .0350 | .0350 | .9594 | .0000 | .0000 | .5538 | .7025 | .6053 | .5647 | .8788 |
| 10 | -5.71 | -2.77 | 9.84 | 41.07 | 53.87 | .0000 | .2955 | .1091 | .0278 | .0278 | .9716 | .0000 | .0000 | .6578 | .6581 | .5772 | .5540 | .8844 |
| 15 | -5.53 | -2.58 | 8.63 | 41.30 | 52.47 | .0000 | .2833 | .0607 | .0159 | .0159 | .9857 | .0000 | .0000 | .7783 | .6265 | .5555 | .5537 | .8859 |
| 30 | -6.26 | -3.26 | 9.61 | 37.84 | 50.68 | .0000 | .2716 | .0382 | .0107 | .0107 | .9919 | .0000 | .0000 | .8369 | .5706 | .5298 | .5344 | .8985 |
| 50 | -7.11 | -3.98 | 9.07 | 36.60 | 49.59 | .0000 | .2812 | .0213 | .0065 | .0065 | .9960 | .0000 | .0000 | .9078 | .5541 | .4979 | .5529 | .9374 |
| 70 | -8.64 | -5.40 | 9.04 | 35.39 | 49.88 | .0000 | .3134 | .0310 | .0102 | .0102 | .9945 | .0000 | .0000 | .8600 | .5341 | .4666 | .7207 | .9804 |
| 85 | -7.34 | -4.03 | 14.89 | 33.02 | 51.99 | .0000 | .3489 | .0634 | .0222 | .0222 | .9887 | .0000 | .0000 | .7970 | .5360 | .4475 | .7444 | .9816 |
| 90 | -5.81 | -2.49 | 17.44 | 33.61 | 53.53 | .0000 | .3762 | .0804 | .0286 | .0286 | .9859 | .0000 | .0000 | .7783 | .5311 | .4318 | .7387 | .9767 |
| 95 | -5.19 | -1.82 | 20.38 | 33.81 | 56.00 | .0000 | .3981 | .0882 | .0318 | .0318 | .9850 | .0000 | .0000 | .7772 | .5227 | .4155 | .7400 | .9750 |

STA-1 STA-2
--LOCAL--

10.0 11.0

TABLE 7.4

BLADE-ELEMENT AND OVERALL PERFORMANCE WITH UNIFORM INLET 70 PERCENT OF DESIGN SPEED

Rotor

| %SPAN | DIA=1 | DIA=2 | V-1 | V-2 | VM=1 | VM=2 | VO=1 | VO=2 | B-1 | B-2 | B=1 | B=2 | V1=1 | V1=2 | VO1=1 | VO1=2 | U-1 | U-2 |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|--------|--------|--------|
| IN | IN | IN | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | DEGREE | DEGREE | DEGREE | DEGREE | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC |
| 5 | 17.467 | 19.769 | 361.0 | 742.5 | 361.0 | 509.9 | .0 | 539.7 | .00 | 46.63 | 58.72 | 14.61 | 695.3 | 527.0 | -594.3 | -132.9 | 594.3 | 672.6 |
| 10 | 18.467 | 20.408 | 368.8 | 703.3 | 368.8 | 491.3 | .0 | 503.1 | .00 | 45.67 | 59.59 | 21.25 | 728.6 | 527.8 | -628.3 | -191.2 | 628.3 | 694.4 |
| 15 | 19.467 | 21.047 | 375.7 | 667.4 | 375.7 | 477.0 | .0 | 466.7 | .00 | 44.37 | 60.43 | 27.57 | 761.5 | 538.8 | -662.3 | -249.4 | 662.3 | 716.1 |
| 30 | 22.314 | 22.964 | 389.3 | 613.6 | 389.3 | 450.3 | .0 | 416.8 | .00 | 42.78 | 62.85 | 38.94 | 853.2 | 579.8 | -759.2 | -364.5 | 759.2 | 781.3 |
| 50 | 25.791 | 25.520 | 393.7 | 566.7 | 393.7 | 427.0 | .0 | 372.5 | .00 | 41.09 | 65.83 | 49.22 | 961.8 | 654.6 | -877.5 | -495.8 | 877.5 | 868.3 |
| 70 | 28.954 | 28.076 | 386.9 | 533.1 | 386.9 | 411.1 | .0 | 339.4 | .00 | 39.54 | 68.56 | 56.27 | 1058.4 | 740.5 | -985.1 | -615.9 | 985.1 | 955.2 |
| 85 | 31.295 | 29.993 | 375.5 | 525.2 | 375.5 | 386.9 | .0 | 355.2 | .00 | 42.55 | 70.57 | 59.82 | 1129.1 | 769.6 | -1064.8 | -665.3 | 1064.8 | 1020.5 |
| 90 | 31.883 | 30.630 | 372.1 | 515.6 | 372.1 | 367.2 | .0 | 362.0 | .00 | 44.59 | 71.07 | 61.64 | 1146.8 | 773.0 | -1084.8 | -680.2 | 1084.8 | 1042.1 |
| 95 | 32.499 | 31.271 | 368.7 | 503.4 | 368.7 | 348.0 | .0 | 363.7 | .00 | 46.27 | 71.56 | 63.57 | 1165.6 | 781.9 | -1105.7 | -700.2 | 1105.7 | 1064.0 |

| %SPAN | INCS | INCM | DEV | TURN | CAMBER | OMEGA-B | D-FAC | OMEGA-B | LOSS-P | PO2/ | PO1 | EFF-P | EFF-AD | EFF-P | M=1 | M=2 | M=1 | M=2 |
|-------|--------|--------|--------|--------|--------|---------|--------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE |
| 5 | 3.34 | 9.77 | 12.74 | 44.11 | 47.12 | .0026 | .4232 | .0117 | .0025 | .0019 | 1.4666 | .9924 | .9920 | .9839 | .3276 | .6558 | .6331 | .4555 |
| 10 | 3.61 | 9.97 | 11.57 | 38.34 | 39.94 | .0036 | .4424 | .0373 | .0080 | .0072 | 1.4371 | .9748 | .9735 | .9513 | .3357 | .6198 | .6677 | .4651 |
| 15 | 3.93 | 9.72 | 11.02 | 33.87 | 33.99 | .0047 | .4455 | .0456 | .0097 | .0087 | 1.4109 | .9653 | .9636 | .9396 | .3420 | .5873 | .6993 | .4741 |
| 30 | 5.00 | 8.95 | 9.21 | 23.91 | 24.18 | .0082 | .4540 | .0760 | .0159 | .0142 | 1.3809 | .9276 | .9242 | .8940 | .3536 | .5378 | .7825 | .5082 |
| 50 | 6.27 | 8.90 | 6.96 | 16.61 | 14.68 | .0111 | .4369 | .0995 | .0198 | .0176 | 1.3566 | .8824 | .8772 | .8475 | .3568 | .4948 | .8767 | .5715 |
| 70 | 7.09 | 8.90 | 5.74 | 12.28 | 9.11 | .0113 | .4071 | .1128 | .0212 | .0190 | 1.3397 | .8437 | .8371 | .8093 | .3505 | .4641 | .9604 | .6446 |
| 85 | 7.22 | 8.48 | 5.67 | 10.75 | 7.98 | .0106 | .4299 | .1742 | .0317 | .0298 | 1.3386 | .7569 | .7466 | .7106 | .3410 | .4543 | 1.0180 | .6658 |
| 90 | 7.22 | 8.32 | 6.49 | 9.43 | 7.61 | .0114 | .4401 | .2031 | .0356 | .0336 | 1.3338 | .7197 | .7081 | .6729 | .3375 | .4447 | 1.0360 | .6667 |
| 95 | 7.34 | 8.26 | 7.68 | 7.99 | 7.42 | .0133 | .4441 | .2228 | .0373 | .0350 | 1.3279 | .6918 | .6792 | .6472 | .3342 | .4332 | 1.0533 | .6728 |

STA=1 STA=2
---LOCAL---

TO/TO PO/PO EFF-AD EFF-P
INLET INLET INLET INLET

1.1089 1.3678 85.96 86.57

8.0 9.0

Stator

| %SPAN | DIA=1 | DIA=2 | V-1 | V-2 | VM=1 | VM=2 | VO=1 | VO=2 | B-1 | B-2 | B=1 | B=2 | V1=1 | V1=2 | VO1=1 | VO1=2 | U-1 | U-2 |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|--------|--------|
| IN | IN | IN | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | DEGREE | DEGREE | DEGREE | DEGREE | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC |
| 5 | 20.409 | 21.489 | 780.5 | 645.2 | 579.6 | 645.2 | 522.8 | 4.7 | 42.05 | .42 | 16.49 | 48.39 | 604.5 | 971.6 | -171.6 | -726.4 | 694.4 | 731.1 |
| 10 | 21.008 | 21.961 | 741.5 | 614.0 | 557.6 | 613.8 | 488.7 | -13.6 | 41.22 | -1.28 | 22.06 | 51.10 | 602.1 | 977.7 | -226.1 | -760.8 | 714.8 | 747.2 |
| 15 | 21.889 | 22.432 | 707.0 | 589.5 | 541.2 | 589.1 | 454.8 | -19.8 | 40.03 | -1.93 | 27.31 | 53.04 | 609.7 | 980.1 | -279.8 | -789.1 | 734.5 | 763.2 |
| 30 | 23.314 | 23.902 | 656.7 | 561.8 | 512.6 | 561.6 | 410.5 | -14.0 | 38.68 | -1.43 | 36.71 | 55.82 | 640.1 | 1000.0 | -382.7 | -827.2 | 793.2 | 813.2 |
| 50 | 25.601 | 25.893 | 616.8 | 528.7 | 492.5 | 528.1 | 371.3 | -25.7 | 37.01 | -2.79 | 45.39 | 59.77 | 701.9 | 1049.3 | -499.8 | -906.7 | 871.0 | 881.0 |
| 70 | 27.818 | 27.902 | 596.8 | 498.7 | 486.0 | 497.8 | 343.6 | -34.1 | 35.15 | -3.41 | 51.01 | 63.05 | 775.6 | 1098.3 | -602.9 | -979.0 | 946.5 | 949.3 |
| 85 | 29.404 | 29.382 | 604.1 | 486.0 | 482.4 | 495.9 | 333.7 | -49.1 | 37.01 | -4.8 | 52.86 | 64.17 | 799.0 | 1115.2 | -636.9 | -1003.8 | 1000.6 | 999.7 |
| 90 | 29.914 | 29.856 | 601.8 | 473.0 | 473.0 | 472.9 | 372.1 | 8.0 | 38.19 | .97 | 53.78 | 64.86 | 800.4 | 1113.2 | -645.7 | -1007.8 | 1017.8 | 1015.8 |
| 95 | 30.382 | 30.293 | 597.8 | 461.1 | 465.7 | 460.9 | 374.7 | 11.3 | 38.82 | 1.40 | 54.75 | 65.67 | 806.9 | 1118.8 | -659.0 | -1019.4 | 1033.7 | 1030.7 |

| %SPAN | INCS | INCM | DEV | TURN | CAMBER | OMEGA-B | D-FAC | OMEGA-B | LOSS-P | PO2/ | PO1 | EFF-P | EFF-AD | EFF-P | M=1 | M=2 | M=1 | M=2 |
|-------|--------|--------|--------|--------|--------|---------|--------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE |
| 5 | -3.77 | -.85 | 12.83 | 41.63 | 55.90 | .0000 | .3341 | .1346 | .0335 | .0335 | .9631 | .0000 | .0000 | .6400 | .6819 | .5640 | .5298 | .8493 |
| 10 | -4.23 | -1.30 | 10.16 | 42.50 | 53.87 | .0000 | .3412 | .1230 | .0314 | .0314 | .9691 | .0000 | .0000 | .7001 | .6467 | .5367 | .5341 | .8545 |
| 15 | -4.41 | -1.47 | 9.05 | 41.96 | 52.47 | .0000 | .3386 | .1030 | .0269 | .0269 | .9762 | .0000 | .0000 | .7193 | .6206 | .5150 | .5405 | .8562 |
| 30 | -3.75 | -.76 | 9.79 | 40.11 | 50.68 | .0000 | .3240 | .0509 | .0143 | .0143 | .9897 | .0000 | .0000 | .8338 | .5766 | .4901 | .5650 | .8724 |
| 50 | -3.69 | -.56 | 9.25 | 39.79 | 49.60 | .0000 | .3390 | .0258 | .0079 | .0079 | .9954 | .0000 | .0000 | .9127 | .5405 | .4601 | .6166 | .9133 |
| 70 | -4.48 | -1.25 | 10.06 | 38.56 | 49.88 | .0000 | .3715 | .0315 | .0104 | .0104 | .9947 | .0000 | .0000 | .9008 | .5224 | .4329 | .6790 | .9534 |
| 85 | -2.41 | .90 | 15.42 | 37.49 | 51.99 | .0000 | .4085 | .0617 | .0216 | .0216 | .9894 | .0000 | .0000 | .8451 | .5261 | .4191 | .6956 | .9617 |
| 90 | -1.31 | 2.02 | 18.37 | 37.22 | 53.53 | .0000 | .4292 | .0785 | .0279 | .0279 | .9867 | .0000 | .0000 | .8186 | .5229 | .4067 | .6952 | .9571 |
| 95 | -.85 | 2.51 | 21.09 | 37.42 | 56.00 | .0000 | .4483 | .0845 | .0319 | .0319 | .9852 | .0000 | .0000 | .8045 | .5185 | .3956 | .6990 | .9598 |

STA=1 STA=2
---LOCAL---

10.0 11.0

NCORR WCORR TO/TO PO/PO EFF-AD EFF-P WCI/AI
INLET INLET INLET INLET INLET LBM/SEC
RPM LBM/SEC \$ \$ \$ SOFT
7798, 120.89 1.1089 1.3512 82.47 83.21 27.14

TABLE 7.5

BLADE-ELEMENT AND OVERALL PERFORMANCE WITH UNIFORM INLET
70 PERCENT OF DESIGN SPEED

Rotor

| %SPAN | DIA-1 | DIA-2 | V-1 | V-2 | VM-1 | VM-2 | VO-1 | VO-2 | B-1 | B-2 | B-1-1 | B-1-2 | V-1-1 | V-1-2 | VO-1-1 | VO-1-2 | U-1 | U-2 |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|--------|--------|--------|
| | IN | IN | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | DEGREE | DEGREE | DEGREE | DEGREE | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC |
| 5 | 17.467 | 19.769 | 346.2 | 346.2 | 346.2 | 474.7 | 0 | 543.7 | 0.00 | 48.11 | 59.70 | 14.57 | 686.2 | 503.9 | -592.4 | -126.8 | 592.4 | 670.5 |
| 10 | 18.467 | 20.408 | 353.7 | 353.7 | 353.7 | 474.4 | 0 | 509.0 | 0.00 | 47.00 | 60.54 | 21.09 | 719.3 | 509.0 | -626.3 | -183.2 | 626.3 | 692.2 |
| 15 | 19.467 | 21.047 | 360.4 | 360.4 | 360.4 | 464.1 | 0 | 475.5 | 0.00 | 45.69 | 61.37 | 27.15 | 752.2 | 522.2 | -660.3 | -238.3 | 660.3 | 713.8 |
| 30 | 22.314 | 22.964 | 373.1 | 373.1 | 373.1 | 433.7 | 0 | 425.7 | 0.00 | 44.46 | 63.76 | 37.10 | 843.8 | 559.8 | -756.8 | -353.2 | 756.8 | 778.9 |
| 50 | 25.791 | 25.520 | 375.8 | 375.8 | 375.8 | 407.7 | 0 | 387.7 | 0.00 | 43.56 | 66.74 | 49.49 | 952.1 | 628.5 | -874.7 | -477.9 | 874.7 | 865.6 |
| 70 | 28.954 | 28.076 | 367.8 | 367.8 | 367.8 | 379.3 | 0 | 368.2 | 0.00 | 44.15 | 69.46 | 56.99 | 1048.7 | 696.4 | -982.0 | -584.0 | 982.0 | 952.2 |
| 85 | 31.275 | 29.993 | 356.9 | 356.9 | 356.9 | 357.9 | 0 | 384.9 | 0.00 | 46.88 | 71.41 | 60.60 | 1119.8 | 729.0 | -1061.4 | -635.1 | 1061.4 | 1017.3 |
| 90 | 31.683 | 30.630 | 353.8 | 353.8 | 353.8 | 346.6 | 0 | 384.9 | 0.00 | 48.00 | 71.88 | 62.07 | 1137.8 | 740.2 | -1081.4 | -654.0 | 1081.4 | 1038.9 |
| 95 | 32.499 | 31.271 | 350.5 | 350.5 | 350.5 | 337.9 | 0 | 384.5 | 0.00 | 48.69 | 72.36 | 63.44 | 1156.7 | 755.8 | -1102.3 | -676.1 | 1102.3 | 1060.6 |

Stator

| %SPAN | INCS | INCM | DEV | TURN | CAMBER | OMEGA-B | D-FAC | OMEGA-B | LOSS-P | LOSS-P | PO2/ | EFF-P | EFF-AD | EFF-P | M-1 | M-2 | M-1-1 | M-1-2 |
|-------|--------|--------|--------|--------|--------|---------|--------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE |
| 5 | 4.31 | 10.74 | 12.70 | 45.12 | 47.12 | 0.039 | 4.505 | 0.026 | 0.006 | 0.003 | 1.4719 | 0.977 | 0.976 | 0.960 | 0.3140 | 0.6441 | 0.6244 | 0.4444 |
| 10 | 4.57 | 10.92 | 11.39 | 39.46 | 39.91 | 0.051 | 4.633 | 0.185 | 0.040 | 0.029 | 1.4481 | 0.9875 | 0.9868 | 0.9764 | 0.3217 | 0.6125 | 0.6591 | 0.4480 |
| 15 | 4.88 | 10.64 | 10.60 | 34.22 | 33.99 | 0.064 | 4.636 | 0.235 | 0.050 | 0.036 | 1.4270 | 0.9824 | 0.9815 | 0.9694 | 0.3279 | 0.5841 | 0.6910 | 0.4591 |
| 30 | 5.74 | 9.87 | 9.36 | 24.66 | 24.17 | 0.102 | 4.744 | 0.658 | 0.138 | 0.116 | 1.3944 | 0.9395 | 0.9366 | 0.9111 | 0.3385 | 0.5319 | 0.7749 | 0.4900 |
| 50 | 7.21 | 9.83 | 7.25 | 17.26 | 14.69 | 0.134 | 4.634 | 1.050 | 0.208 | 0.181 | 1.3713 | 0.8821 | 0.8761 | 0.8400 | 0.4901 | 0.4901 | 0.8691 | 0.5475 |
| 70 | 8.00 | 9.80 | 6.50 | 12.47 | 9.15 | 0.135 | 4.528 | 1.475 | 0.272 | 0.247 | 1.3543 | 0.8122 | 0.8039 | 0.7709 | 0.3327 | 0.4583 | 0.9518 | 0.6036 |
| 85 | 8.06 | 9.33 | 6.45 | 10.81 | 7.98 | 0.122 | 4.700 | 1.992 | 0.354 | 0.333 | 1.3570 | 0.7416 | 0.7303 | 0.6910 | 0.3238 | 0.4511 | 1.0083 | 0.6281 |
| 90 | 8.04 | 9.14 | 6.93 | 9.81 | 7.61 | 0.129 | 4.718 | 2.162 | 0.374 | 0.352 | 1.3559 | 0.7202 | 0.7080 | 0.6692 | 0.3206 | 0.4453 | 1.0261 | 0.6364 |
| 95 | 8.14 | 9.06 | 7.55 | 8.91 | 7.41 | 0.148 | 4.690 | 2.263 | 0.380 | 0.355 | 1.3550 | 0.7054 | 0.6926 | 0.6549 | 0.3175 | 0.4394 | 1.0436 | 0.6488 |

STA-1 STA-2
---LOCAL---

8.0 9.0

TO/TO PO/PO EFF-AD EFF-P
INLET INLET INLET INLET

1.1135 1.3836 85.66 86.30

Rotor

| %SPAN | DIA-1 | DIA-2 | V-1 | V-2 | VM-1 | VM-2 | VO-1 | VO-2 | B-1 | B-2 | B-1-1 | B-1-2 | V-1-1 | V-1-2 | VO-1-1 | VO-1-2 | U-1 | U-2 |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|--------|--------|
| | IN | IN | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | DEGREE | DEGREE | DEGREE | DEGREE | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC |
| 5 | 20.409 | 21.489 | 763.9 | 610.8 | 553.4 | 610.8 | 526.7 | 3.5 | 43.59 | 33 | 16.65 | 49.90 | 577.6 | 948.2 | -165.5 | -725.3 | 692.2 | 728.8 |
| 10 | 21.008 | 21.961 | 729.4 | 580.8 | 536.3 | 580.6 | 494.4 | -13.3 | 42.66 | -1.33 | 22.12 | 52.55 | 579.4 | 955.1 | -218.1 | -758.1 | 712.5 | 744.8 |
| 15 | 21.809 | 22.432 | 699.1 | 556.2 | 523.4 | 555.9 | 453.4 | -18.5 | 41.51 | -1.90 | 27.17 | 54.50 | 588.9 | 957.4 | -268.8 | -779.3 | 732.2 | 760.8 |
| 30 | 23.314 | 23.902 | 645.8 | 527.7 | 491.2 | 527.6 | 419.3 | -10.9 | 40.48 | -1.19 | 37.06 | 57.29 | 616.3 | 976.5 | -371.5 | -821.6 | 790.7 | 810.7 |
| 50 | 25.601 | 25.893 | 607.1 | 497.4 | 468.1 | 496.8 | 386.6 | -25.4 | 39.55 | -2.92 | 45.79 | 61.19 | 672.0 | 1031.2 | -481.7 | -903.6 | 868.3 | 878.2 |
| 70 | 27.818 | 27.902 | 586.1 | 465.4 | 452.3 | 464.6 | 372.6 | -27.7 | 39.48 | -3.41 | 51.61 | 64.50 | 728.3 | 1079.2 | -570.8 | -974.1 | 943.5 | 946.3 |
| 85 | 29.408 | 29.382 | 594.4 | 458.0 | 447.6 | 457.9 | 371.0 | -6 | 41.14 | -0.7 | 53.57 | 65.33 | 753.7 | 1097.2 | -606.4 | -997.1 | 997.4 | 996.5 |
| 90 | 29.914 | 29.856 | 594.9 | 451.3 | 444.5 | 451.2 | 395.4 | 10.6 | 41.66 | 1.34 | 54.33 | 65.76 | 762.2 | 1099.0 | -619.2 | -1002.1 | 1014.6 | 1012.6 |
| 95 | 30.382 | 30.293 | 595.3 | 443.7 | 444.5 | 443.5 | 376.1 | 13.4 | 41.70 | 1.73 | 54.98 | 66.38 | 774.6 | 1106.8 | -634.4 | -1014.0 | 1030.5 | 1027.4 |

STA-1 STA-2
---LOCAL---

8.0 9.0

TO/TO PO/PO EFF-AD EFF-P
INLET INLET INLET INLET

1.1135 1.3836 85.66 86.30

STA-1 STA-2
---LOCAL---

10.0 11.0

TO/TO PO/PO EFF-AD EFF-P
INLET INLET INLET INLET

1.1135 1.3836 85.66 86.30

TABLE 7.6

BLADE-ELEMENT AND OVERALL PERFORMANCE WITH UNIFORM INLET 70 PERCENT OF DESIGN SPEED

Rotor

| %SPAN | DIA-1 IN | DIA-2 IN | V-1 FT/SEC | V-2 FT/SEC | VM-1 FT/SEC | VM-2 FT/SEC | VO-1 FT/SEC | VO-2 FT/SEC | B-1 DEGREE | B-2 DEGREE | B-1-1 DEGREE | B-1-2 DEGREE | V1-1 FT/SEC | V1-2 FT/SEC | VO1-1 FT/SEC | VO1-2 FT/SEC | U-1 FT/SEC | U-2 FT/SEC |
|-------|-------------|-------------|---------------|---------------|----------------|----------------|----------------|----------------|---------------|---------------|-----------------|-----------------|----------------|----------------|-----------------|-----------------|---------------|---------------|
| 5 | 17.467 | 19.769 | 330.8 | 727.3 | 330.8 | 467.9 | 0 | 556.8 | .00 | 49.96 | 60.81 | 13.50 | 678.1 | 481.5 | -592.0 | -113.2 | 592.0 | 670.0 |
| 10 | 18.467 | 20.408 | 337.9 | 694.4 | 337.9 | 457.8 | 0 | 522.0 | .00 | 48.73 | 61.64 | 20.30 | 711.3 | 488.9 | -625.9 | -169.7 | 625.9 | 691.7 |
| 15 | 19.467 | 21.047 | 344.1 | 663.7 | 344.1 | 449.1 | 0 | 488.7 | .00 | 47.41 | 62.45 | 26.53 | 744.1 | 502.8 | -659.8 | -224.6 | 659.8 | 713.3 |
| 30 | 22.314 | 22.964 | 355.9 | 606.0 | 355.9 | 417.4 | 0 | 439.3 | .00 | 46.46 | 64.79 | 39.02 | 835.8 | 538.3 | -756.3 | -339.0 | 756.3 | 778.3 |
| 50 | 25.791 | 25.520 | 357.7 | 548.5 | 357.7 | 395.3 | 0 | 408.6 | .00 | 45.95 | 67.74 | 49.06 | 944.5 | 604.1 | -874.1 | -456.4 | 874.1 | 864.9 |
| 70 | 28.954 | 28.076 | 348.7 | 540.7 | 348.7 | 359.1 | 0 | 404.2 | .00 | 48.39 | 70.44 | 56.72 | 1041.4 | 654.7 | -981.3 | -547.3 | 981.3 | 951.6 |
| 85 | 31.295 | 29.993 | 337.8 | 528.2 | 337.8 | 324.0 | 0 | 417.2 | .00 | 52.17 | 72.33 | 61.60 | 1113.2 | 681.3 | -1060.7 | -599.3 | 1060.7 | 1016.5 |
| 90 | 31.883 | 30.630 | 334.9 | 529.0 | 334.9 | 324.6 | 0 | 417.7 | .00 | 52.15 | 72.78 | 62.38 | 1131.3 | 700.2 | -1080.6 | -620.4 | 1080.6 | 1038.1 |
| 95 | 32.499 | 31.271 | 331.8 | 521.8 | 331.8 | 316.6 | 0 | 414.8 | .00 | 52.64 | 73.23 | 63.85 | 1150.4 | 718.6 | -1101.5 | -645.0 | 1101.5 | 1059.8 |

| %SPAN | INCS DEGREE | INCM DEGREE | DEV DEGREE | TURN DEGREE | CAMBER DEGREE | OMEGA-B SHOCK | D-FAC OMEGA-B | LOSS-P TOTAL | LOSS-P PROFILE | P02/ P01 | B-1-1 DEGREE | B-1-2 DEGREE | V1-1 FT/SEC | V1-2 FT/SEC | VO1-1 FT/SEC | VO1-2 FT/SEC | M-1 | M-2 | M1-1 | M1-2 |
|-------|----------------|----------------|---------------|----------------|------------------|------------------|------------------|-----------------|-------------------|-------------|-----------------|-----------------|----------------|----------------|-----------------|-----------------|-------|-------|--------|-------|
| 5 | 5.42 | 11.85 | 11.73 | 47.21 | 47.12 | .0061 | .4816 | .0261 | .0056 | .0043 | 1.4771 | .9852 | .9844 | .9688 | .2999 | .6403 | .2999 | .6403 | .6176 | .4239 |
| 10 | 5.67 | 12.00 | 10.59 | 41.33 | 39.89 | .0075 | .4900 | .0341 | .0074 | .0057 | 1.4557 | .9785 | .9773 | .9588 | .3072 | .6102 | .3072 | .6102 | .6525 | .4296 |
| 15 | 5.97 | 11.69 | 10.11 | 35.92 | 34.11 | .0089 | .4883 | .0364 | .0078 | .0059 | 1.4356 | .9743 | .9730 | .9548 | .3130 | .5826 | .3130 | .5826 | .6848 | .4413 |
| 30 | 7.00 | 10.90 | 9.27 | 25.78 | 24.15 | .0132 | .4996 | .0810 | .0170 | .0141 | 1.4028 | .9290 | .9255 | .8947 | .3227 | .5294 | .3227 | .5294 | .7690 | .4703 |
| 50 | 8.24 | 10.83 | 6.83 | 18.68 | 14.69 | .0163 | .4916 | .1239 | .0248 | .0215 | 1.3867 | .8892 | .8630 | .8355 | .3230 | .4942 | .3230 | .4942 | .8639 | .5252 |
| 70 | 8.98 | 10.76 | 6.29 | 13.71 | 9.21 | .0164 | .5004 | .1890 | .0350 | .0320 | 1.3746 | .7805 | .7704 | .7265 | .3146 | .4668 | .3146 | .4668 | .9468 | .5652 |
| 85 | 8.99 | 10.24 | 7.48 | 10.73 | 8.01 | .0145 | .5208 | .2425 | .0418 | .0393 | 1.3734 | .7101 | .6969 | .6506 | .3059 | .4528 | .3059 | .4528 | 1.0023 | .5842 |
| 90 | 8.94 | 10.04 | 7.24 | 10.40 | 7.62 | .0151 | .5146 | .2485 | .0425 | .0399 | 1.3777 | .7023 | .6886 | .6417 | .3030 | .4530 | .3030 | .4530 | 1.0197 | .5996 |
| 95 | 9.02 | 9.94 | 7.97 | 9.38 | 7.42 | .0171 | .5082 | .2544 | .0421 | .0393 | 1.3767 | .6916 | .6775 | .6326 | .3002 | .4462 | .3002 | .4462 | 1.0371 | .6144 |

TO/TO PO/PO EFF-AD EFF-P
INLET INLET INLET INLET
\$ \$
1.1200 1.3983 83.79 84.54

Stator

| %SPAN | DIA-1 | DIA-2 | V-1 | V-2 | VM-1 | VM-2 | VO-1 | VO-2 | B-1 | B-2 | B1-1 | B1-2 | V1-1 | V1-2 | VO1-1 | VO1-2 | U-1 | U-2 |
|-------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|---------|--------|--------|
| 5 | 20.409 | 21.489 | 756.2 | 583.5 | 530.0 | 583.5 | 539.4 | 3.1 | 45.50 | .30 | 16.04 | 51.18 | 551.5 | 930.8 | -152.3 | -725.2 | 691.7 | 728.3 |
| 10 | 21.008 | 21.961 | 723.5 | 554.3 | 516.0 | 554.1 | 507.1 | -12.8 | 44.49 | -1.34 | 21.64 | 53.80 | 555.7 | 938.4 | -204.9 | -757.1 | 712.0 | 744.3 |
| 15 | 21.589 | 22.432 | 693.8 | 528.3 | 504.5 | 527.9 | 476.3 | -19.1 | 43.35 | -2.08 | 26.83 | 55.89 | 566.0 | 941.5 | -255.4 | -779.4 | 731.7 | 760.3 |
| 30 | 23.314 | 23.902 | 639.3 | 498.3 | 470.6 | 498.1 | 432.6 | -13.7 | 42.59 | -1.58 | 37.18 | 58.84 | 591.5 | 962.8 | -357.5 | -823.8 | 770.2 | 810.1 |
| 50 | 25.601 | 25.893 | 607.2 | 472.3 | 450.2 | 471.9 | 407.4 | -19.7 | 42.14 | -2.39 | 45.61 | 62.25 | 644.1 | 1013.9 | -460.3 | -897.2 | 867.7 | 877.6 |
| 70 | 27.818 | 27.902 | 590.3 | 442.0 | 426.1 | 441.7 | 408.5 | -15.9 | 43.79 | -2.06 | 51.43 | 65.33 | 683.5 | 1058.2 | -534.3 | -961.6 | 942.8 | 945.7 |
| 85 | 29.408 | 29.382 | 591.0 | 427.2 | 409.1 | 427.2 | 426.5 | 3.2 | 46.19 | .42 | 54.34 | 66.72 | 701.8 | 1080.7 | -570.2 | -992.7 | 976.7 | 995.8 |
| 90 | 29.914 | 29.856 | 595.6 | 425.7 | 413.6 | 425.6 | 428.7 | 9.2 | 46.03 | 1.24 | 54.75 | 67.00 | 716.6 | 1089.3 | -585.2 | -1002.7 | 1013.8 | 1011.9 |
| 95 | 30.382 | 30.293 | 594.4 | 422.4 | 413.3 | 422.2 | 427.2 | 12.4 | 45.94 | 1.69 | 55.55 | 67.40 | 730.7 | 1098.6 | -602.5 | -1014.2 | 1029.7 | 1026.7 |

| %SPAN | INCS | INCM | DEV | TURN | CAMBER | OMEGA-B | D-FAC | OMEGA-B | LOSS-P | LOSS-P | P02/ | EFF-P | EFF-AD | EFF-P | M-1 | M-2 | M1-1 | M1-2 |
|-------|-------|-------|-------|-------|--------|---------|-------|---------|--------|--------|-------|-------|--------|-------|-------|-------|-------|-------|
| 5 | -5.50 | 2.42 | 12.71 | 45.20 | 55.89 | .0000 | .4001 | .1238 | .0308 | .0308 | .9680 | .0000 | .0000 | .7371 | .6605 | .5064 | .4839 | .8078 |
| 10 | -9.7 | 1.97 | 10.10 | 45.83 | 53.86 | .0000 | .4134 | .1237 | .0316 | .0316 | .9704 | .0000 | .0000 | .7400 | .6308 | .4810 | .4920 | .8143 |
| 15 | -1.08 | 1.87 | 8.93 | 45.42 | 52.50 | .0000 | .4219 | .1202 | .0314 | .0314 | .9732 | .0000 | .0000 | .7562 | .6072 | .4582 | .4995 | .8165 |
| 30 | 1.16 | 3.16 | 9.64 | 44.17 | 50.67 | .0001 | .4142 | .0650 | .0182 | .0182 | .9875 | .0000 | .0000 | .8508 | .5598 | .4315 | .5189 | .8137 |
| 50 | 1.40 | 4.52 | 9.85 | 44.53 | 49.61 | .0010 | .4365 | .0451 | .0138 | .0135 | .9922 | .0000 | .0000 | .9011 | .5300 | .4076 | .5613 | .8748 |
| 70 | 4.01 | 7.24 | 11.42 | 45.85 | 49.92 | .0063 | .4892 | .0643 | .0213 | .0192 | .9895 | .0000 | .0000 | .8818 | .5118 | .3789 | .5920 | .9071 |
| 85 | 6.80 | 10.11 | 16.33 | 45.77 | 52.00 | .0139 | .5277 | .0982 | .0343 | .0295 | .9841 | .0000 | .0000 | .8198 | .5089 | .3637 | .6037 | .9201 |
| 90 | 6.57 | 9.89 | 18.64 | 44.79 | 53.53 | .0107 | .5359 | .1164 | .0413 | .0375 | .9809 | .0000 | .0000 | .7880 | .5129 | .3619 | .6161 | .9261 |
| 95 | 6.33 | 9.69 | 21.38 | 44.26 | 55.99 | .0065 | .5413 | .1195 | .0431 | .0408 | .9805 | .0000 | .0000 | .7814 | .5114 | .3588 | .6271 | .9331 |

STA-1 STA-2
--LOCAL--

10.0 11.0

NCORR WCORR TO/TO PO/PO EFF-AD EFF-P WC1/A1
INLET INLET INLET INLET
RPM LBM/SEC \$ \$ SOFT
7767. 110.81 1.1200 1.3767 79.73 80.62 24.37

TABLE 8.1

BLADE-ELEMENT AND OVERALL PERFORMANCE WITH UNIFORM INLET
88 PERCENT OF DESIGN SPEED

Rotor

| %SPAN | DIA-1 IN | DIA-2 IN | V-1 FT/SEC | V-2 FT/SEC | VM-1 FT/SEC | VM-2 FT/SEC | V0-1 FT/SEC | V0-2 FT/SEC | B-1 DEGREE | B-2 DEGREE | B*-1 DEGREE | B*-2 DEGREE | V*-1 FT/SEC | V*-2 FT/SEC | V0*-1 FT/SEC | V0*-2 FT/SEC | U-1 FT/SEC | U-2 FT/SEC |
|-------|-------------|-------------|---------------|---------------|----------------|----------------|----------------|----------------|---------------|---------------|----------------|----------------|----------------|----------------|-----------------|-----------------|---------------|---------------|
| | | | | | | | | | | | | | | | | | | |
| 5 | 17.467 | 19.769 | 515.7 | 936.6 | 515.7 | 670.3 | .0 | 654.2 | .00 | 44.30 | 55.14 | 15.33 | 902.3 | 695.1 | 740.4 | -183.8 | 740.4 | 838.0 |
| 10 | 18.467 | 20.408 | 527.9 | 879.8 | 527.9 | 633.8 | .0 | 610.2 | .00 | 43.92 | 56.01 | 21.94 | 944.2 | 683.6 | 782.8 | -254.9 | 782.8 | 865.1 |
| 15 | 19.467 | 21.047 | 538.6 | 822.3 | 538.6 | 582.1 | .0 | 580.8 | .00 | 44.93 | 56.87 | 28.11 | 985.4 | 660.4 | 825.2 | -311.4 | 825.2 | 892.2 |
| 30 | 22.314 | 22.964 | 563.0 | 793.0 | 563.0 | 613.1 | .0 | 502.9 | .00 | 39.35 | 59.24 | 37.49 | 1100.7 | 773.0 | 945.9 | -470.6 | 945.9 | 973.4 |
| 50 | 25.791 | 25.520 | 577.9 | 736.2 | 577.9 | 597.5 | .0 | 430.1 | .00 | 35.82 | 62.14 | 47.48 | 1236.6 | 884.2 | 1093.3 | -651.7 | 1093.3 | 1081.8 |
| 70 | 28.954 | 28.076 | 571.3 | 675.3 | 571.3 | 559.4 | .0 | 374.7 | .00 | 33.82 | 65.04 | 55.54 | 1353.8 | 988.9 | 1227.3 | -815.4 | 1227.3 | 1190.1 |
| 85 | 31.295 | 29.993 | 554.6 | 656.4 | 554.6 | 528.8 | .0 | 388.9 | .00 | 36.33 | 67.31 | 59.07 | 1437.8 | 1028.8 | 1326.6 | -882.5 | 1326.6 | 1271.4 |
| 90 | 31.883 | 30.630 | 549.3 | 659.9 | 549.3 | 520.7 | .0 | 403.3 | .00 | 37.90 | 67.80 | 59.75 | 1458.8 | 1033.8 | 1351.5 | -893.0 | 1351.5 | 1286.4 |
| 95 | 32.499 | 31.271 | 543.6 | 646.9 | 543.6 | 498.1 | .0 | 412.8 | .00 | 39.65 | 68.47 | 61.38 | 1481.0 | 1039.8 | 1377.6 | -912.7 | 1377.6 | 1325.5 |

TO/TO PO/PO EFF-AD EFF-P
INLET INLET INLET INLET

Stator

| %SPAN | DIA-1 IN | DIA-2 IN | V-1 FT/SEC | V-2 FT/SEC | VM-1 FT/SEC | VM-2 FT/SEC | V0-1 FT/SEC | V0-2 FT/SEC | B-1 DEGREE | B-2 DEGREE | B*-1 DEGREE | B*-2 DEGREE | V*-1 FT/SEC | V*-2 FT/SEC | V0*-1 FT/SEC | V0*-2 FT/SEC | U-1 FT/SEC | U-2 FT/SEC |
|-------|-------------|-------------|---------------|---------------|----------------|----------------|----------------|----------------|---------------|---------------|----------------|----------------|----------------|----------------|-----------------|-----------------|---------------|---------------|
| | | | | | | | | | | | | | | | | | | |
| 5 | 20.409 | 21.489 | 1003.0 | 922.2 | 777.4 | 914.8 | 633.8 | -117.2 | 39.19 | -7.30 | 16.57 | 48.34 | 811.1 | 1376.1 | -231.4 | -1028.1 | 865.1 | 910.9 |
| 10 | 21.008 | 21.961 | 949.8 | 894.9 | 742.1 | 856.0 | 592.8 | -127.0 | 38.62 | -8.07 | 21.88 | 49.74 | 793.9 | 1386.4 | -297.7 | -1057.9 | 890.5 | 930.9 |
| 15 | 21.589 | 22.432 | 897.5 | 887.3 | 696.5 | 879.0 | 566.0 | -120.9 | 39.10 | -7.83 | 26.60 | 50.64 | 779.3 | 1386.1 | -349.1 | -1071.7 | 915.1 | 950.9 |
| 30 | 23.314 | 23.902 | 872.6 | 857.7 | 718.7 | 851.9 | 494.9 | -98.9 | 34.55 | -6.62 | 34.46 | 52.54 | 871.9 | 1400.9 | -493.4 | -1112.0 | 988.3 | 1013.2 |
| 50 | 25.601 | 25.693 | 828.8 | 819.7 | 709.5 | 814.9 | 428.3 | -88.5 | 31.12 | -6.20 | 42.78 | 55.50 | 967.0 | 1439.2 | -656.9 | -1186.1 | 1085.2 | 1097.6 |
| 70 | 27.818 | 27.902 | 792.0 | 766.2 | 695.6 | 757.3 | 378.5 | -116.5 | 28.55 | -8.75 | 49.01 | 59.76 | 1060.6 | 1503.9 | -800.6 | -1299.3 | 1179.2 | 1182.7 |
| 85 | 29.408 | 29.382 | 803.0 | 742.4 | 697.1 | 737.3 | 398.6 | -127.6 | 29.76 | -6.77 | 50.58 | 61.05 | 1097.7 | 1523.4 | -848.0 | -1333.1 | 1246.6 | 1245.5 |
| 90 | 29.914 | 29.856 | 817.4 | 752.1 | 702.0 | 750.0 | 418.6 | -55.7 | 30.81 | -4.25 | 50.43 | 60.42 | 1101.9 | 1519.3 | -849.4 | -1321.3 | 1268.0 | 1265.6 |
| 95 | 30.362 | 30.293 | 815.6 | 747.2 | 695.9 | 743.9 | 425.4 | -70.2 | 31.44 | -5.39 | 51.10 | 61.22 | 1108.2 | 1545.2 | -862.5 | -1354.3 | 1287.9 | 1284.1 |

NCORR WCORR TO/TO PO/PO EFF-AD EFF-P WCI/A1
INLET INLET INLET INLET INLET LBM/SEC

RPM LBM/SEC
9715. 154.69 1.1573 1.4620 72.86 74.26 36.97

STA-1 STA-2
---LOCAL---

8.0 9.0

STA-1 STA-2
---LOCAL---

10.0 11.0

TABLE 8.2

**BLADE-ELEMENT AND OVERALL PERFORMANCE WITH UNIFORM INLET
88 PERCENT OF DESIGN SPEED**

Rotor

| %SPAN | DIA-1 | | DIA-2 | | V-1 FT/SEC | V-2 FT/SEC | VM-1 FT/SEC | VM-2 FT/SEC | V0-1 FT/SEC | V0-2 FT/SEC | B-1 DEGREE | B-2 DEGREE | B1-1 DEGREE | B1-2 DEGREE | B'-1 DEGREE | B'-2 DEGREE | V1-1 FT/SEC | V1-2 FT/SEC | V01-1 FT/SEC | V01-2 FT/SEC | U-1 FT/SEC | U-2 FT/SEC |
|-------|----------------|----------------|----------------|----------------|------------------|------------------|-----------------|-------------------|-----------------|-------------------|---------------|----------------|-----------------|-----------------|----------------|----------------|----------------|----------------|-----------------|-----------------|---------------|---------------|
| | IN | IN | IN | IN | | | | | | | | | | | | | | | | | | |
| 5 | 17.467 | 19.769 | 503.1 | 913.2 | 503.1 | 634.9 | 0 | 656.4 | 0 | 656.4 | 0 | 45.95 | 55.79 | 15.93 | 894.9 | 660.3 | 740.1 | 181.2 | 740.1 | 837.6 | 837.6 | |
| 10 | 18.467 | 20.408 | 514.9 | 859.7 | 514.9 | 598.4 | 0 | 617.2 | 0 | 617.2 | 0 | 45.89 | 56.65 | 22.49 | 936.7 | 648.1 | 782.5 | 247.5 | 782.5 | 864.7 | 864.7 | |
| 15 | 19.467 | 21.047 | 525.4 | 803.4 | 525.4 | 557.0 | 0 | 578.9 | 0 | 578.9 | 0 | 46.10 | 57.50 | 29.28 | 977.9 | 639.2 | 824.8 | 312.9 | 824.8 | 891.8 | 891.8 | |
| 30 | 22.314 | 22.964 | 548.6 | 767.4 | 548.6 | 571.1 | 0 | 512.5 | 0 | 512.5 | 0 | 41.90 | 59.88 | 38.68 | 1093.1 | 733.8 | 945.5 | 460.5 | 945.5 | 973.0 | 973.0 | |
| 50 | 25.791 | 25.520 | 561.8 | 717.1 | 561.8 | 554.1 | 0 | 455.3 | 0 | 455.3 | 0 | 39.41 | 62.79 | 48.48 | 1238.7 | 836.1 | 1093.8 | 626.0 | 1093.8 | 1081.3 | 1081.3 | |
| 70 | 28.954 | 28.076 | 555.8 | 663.8 | 555.8 | 522.2 | 0 | 409.9 | 0 | 409.9 | 0 | 38.13 | 65.63 | 56.18 | 1346.8 | 938.5 | 1226.8 | 779.7 | 1226.8 | 1169.6 | 1169.6 | |
| 85 | 31.295 | 29.993 | 539.9 | 675.2 | 539.9 | 516.3 | 0 | 435.2 | 0 | 435.2 | 0 | 40.12 | 67.85 | 58.29 | 1431.7 | 982.3 | 1326.0 | 835.7 | 1326.0 | 1270.4 | 1270.4 | |
| 90 | 31.883 | 30.630 | 534.5 | 677.7 | 534.5 | 502.7 | 0 | 454.5 | 0 | 454.5 | 0 | 42.12 | 68.41 | 59.20 | 1452.8 | 981.8 | 1350.9 | 843.3 | 1350.9 | 1297.8 | 1297.8 | |
| 95 | 32.499 | 31.271 | 529.1 | 639.1 | 529.1 | 447.0 | 0 | 456.8 | 0 | 456.8 | 0 | 45.62 | 68.98 | 62.76 | 1475.1 | 976.6 | 1377.0 | 868.2 | 1377.0 | 1325.0 | 1325.0 | |
| %SPAN | INCS DEGREE | INCM DEGREE | DEV DEGREE | TURN DEGREE | CAMBER DEGREE | OMEGA-B SHOCK | D-FAC DEGREE | OMEGA-B DEGREE | LOSS-P TOTAL | LOSS-P PROFILE | PO2/ TOTAL | EFF-P TOTAL | EFF-AD TOTAL | EFF-P STATIC | M-1 | M-2 | M'-1 | M'-2 | STA-1 | | | |
| | | | | | | | | | | | | | | | | | | | STA-1 | LOCAL | | |
| 5 | .40 | 6.83 | 14.06 | 39.86 | 47.12 | .0058 | .4333 | .0265 | .0056 | .0044 | 1.7490 | .9827 | .9812 | .9682 | .4610 | .8010 | .8218 | .5792 | | | | |
| 10 | .66 | 7.04 | 12.86 | 34.16 | 39.99 | .0076 | .4672 | .0780 | .0166 | .0149 | 1.6893 | .9473 | .9431 | .9132 | .4732 | .7506 | .8647 | .5656 | | | | |
| 15 | .95 | 6.85 | 12.76 | 28.22 | 34.03 | .0096 | .4942 | .1223 | .0256 | .0236 | 1.6282 | .9083 | .9017 | .8489 | .4883 | .6289 | .9432 | .5555 | | | | |
| 30 | 1.92 | 5.95 | 9.12 | 21.02 | 24.19 | .0157 | .4568 | .0698 | .0146 | .0113 | 1.6293 | .9345 | .9298 | .9147 | .5040 | .6659 | 1.0069 | .6367 | | | | |
| 50 | 3.17 | 5.84 | 6.14 | 14.31 | 14.62 | .0302 | .4320 | .0737 | .0149 | .0088 | 1.6001 | .9151 | .9093 | .9007 | .5162 | .6194 | 1.1295 | .7221 | | | | |
| 70 | 4.13 | 5.98 | 5.60 | 9.45 | 9.06 | .0467 | .4046 | .0923 | .0174 | .0086 | 1.5629 | .8772 | .8692 | .8662 | .5107 | .5707 | 1.2346 | .8068 | | | | |
| 85 | 4.46 | 5.74 | 4.10 | 9.56 | 7.94 | .0592 | .4217 | .1469 | .0284 | .0173 | 1.5853 | .8055 | .7923 | .7843 | .5107 | .5756 | 1.3055 | .8743 | | | | |
| 90 | 4.56 | 5.66 | 4.04 | 9.21 | 7.60 | .0638 | .4374 | .1692 | .0353 | .0234 | 1.5910 | .7651 | .7490 | .7396 | .4910 | .5748 | 1.3279 | .8327 | | | | |
| 95 | 4.75 | 5.67 | 6.86 | 6.23 | 7.41 | .0710 | .4520 | .2279 | .0392 | .0271 | 1.5563 | .7118 | .6932 | .6938 | .4853 | .5390 | 1.3491 | .8235 | | | | |
| | | | TO/TO INLET | PO/PO INLET | EFF-AD INLET | EFF-P INLET | % | | | | | | | | | | | | | | | |
| | | | 1.1665 | 1.6062 | 87.00 | 87.85 | % | | | | | | | | | | | | | | | |
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Stator

| %SPAN | DIA-1 | | DIA-2 | | V-1 | | V-2 | | VM-1 | | VM-2 | | V0-1 | | V0-2 | | B-1 | | B-2 | | B+1 | | B+2 | | V+1 | | V+2 | | V0+1 | | U-1 | | U-2 | |
|-------|--------|--------|--------|--------|--------|--------|---------|--------|---------|--------|--------|---------|--------|--------|--------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-----|--|
| | IN | IN | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | | |
| 5 | 20.409 | 21.489 | 968.6 | 789.0 | 730.7 | 789.0 | 635.8 | -5.4 | 41.03 | -3.39 | 17.39 | 49.26 | 765.7 | 1208.9 | -228.9 | -915.9 | 864.7 | 910.5 | | | | | | | | | | | | | | | | |
| 10 | 21.008 | 21.961 | 917.6 | 754.2 | 694.7 | 753.7 | 599.6 | -26.1 | 40.80 | -1.99 | 22.71 | 51.77 | 753.4 | 1218.0 | -290.5 | -936.6 | 890.1 | 930.5 | | | | | | | | | | | | | | | | |
| 15 | 21.589 | 22.432 | 865.5 | 728.2 | 650.3 | 727.6 | 554.7 | -28.9 | 40.68 | -2.27 | 28.09 | 53.39 | 744.3 | 1220.1 | -350.6 | -979.3 | 914.7 | 950.5 | | | | | | | | | | | | | | | | |
| 30 | 23.314 | 23.902 | 834.0 | 712.7 | 664.0 | 712.3 | 504.7 | -24.6 | 37.24 | -1.98 | 36.02 | 55.52 | 821.4 | 1258.4 | -483.1 | -1037.3 | 987.8 | 1012.7 | | | | | | | | | | | | | | | | |
| 50 | 25.601 | 25.893 | 794.8 | 688.2 | 652.5 | 687.7 | 453.8 | -26.9 | 34.81 | -2.25 | 44.02 | 58.54 | 907.8 | 1317.8 | -631.0 | -1124.0 | 1084.7 | 1012.7 | | | | | | | | | | | | | | | | |
| 70 | 27.818 | 27.902 | 763.3 | 648.0 | 641.2 | 646.5 | 414.0 | -42.8 | 32.85 | -3.78 | 50.02 | 62.18 | 997.9 | 1385.1 | -764.6 | -1225.0 | 1178.7 | 1162.2 | | | | | | | | | | | | | | | | |
| 85 | 29.408 | 29.382 | 795.6 | 643.4 | 659.9 | 643.2 | 446.2 | 15.5 | 34.07 | 1.38 | 50.47 | 62.38 | 1036.9 | 1387.5 | -799.8 | -1229.5 | 1246.0 | 1244.9 | | | | | | | | | | | | | | | | |
| 90 | 29.914 | 29.856 | 807.8 | 644.5 | 658.0 | 643.5 | 458.5 | 34.7 | 35.45 | 3.09 | 50.53 | 62.39 | 1035.0 | 1388.5 | -798.9 | -1230.3 | 1267.5 | 1265.0 | | | | | | | | | | | | | | | | |
| 95 | 30.382 | 30.293 | 784.2 | 608.2 | 627.4 | 607.9 | 470.5 | 17.5 | 36.87 | 1.65 | 52.47 | 64.35 | 1030.0 | 1404.4 | -816.8 | -1266.0 | 1287.3 | 1283.5 | | | | | | | | | | | | | | | | |
| %SPAN | INCS | INCM | DEV | TURN | TURN | CAMBER | OMEGA-B | D-FAC | OMEGA-B | LOSS-P | LOSS-P | PROFITE | PO2/ | EFF-P | EFF-AD | EFF-P | M-1 | M-2 | M+1 | M+2 | M+1 | M+2 | M+1 | M+2 | M+1 | M+2 | M+1 | M+2 | M+1 | M+2 | M+1 | M+2 | | |
| 5 | -4.82 | -1.90 | 12.02 | 41.42 | 55.90 | 0.000 | 3459 | 1531 | 0381 | 0381 | 0381 | 0381 | 9417 | 0.000 | 0.000 | 0.000 | 8423 | 6812 | 8423 | 6812 | 8423 | 6812 | 8423 | 6812 | 8423 | 6812 | 8423 | 6812 | 8423 | 6812 | 8423 | 6812 | | |
| 10 | -4.26 | -1.33 | 9.45 | 42.79 | 53.88 | 0.000 | 3486 | 1232 | 0314 | 0314 | 0314 | 0314 | 9570 | 0.000 | 0.000 | 0.000 | 7920 | 6506 | 7920 | 6506 | 7920 | 6506 | 7920 | 6506 | 7920 | 6506 | 7920 | 6506 | 7920 | 6506 | 7920 | 6506 | | |
| 15 | -3.86 | -0.91 | 8.66 | 42.95 | 52.42 | 0.000 | 3347 | 0640 | 0167 | 0167 | 0167 | 0167 | 9379 | 0.000 | 0.000 | 0.000 | 7549 | 6277 | 7549 | 6277 | 7549 | 6277 | 7549 | 6277 | 7549 | 6277 | 7549 | 6277 | 7549 | 6277 | 7549 | 6277 | | |
| 30 | -5.25 | -2.24 | 9.25 | 39.21 | 50.68 | 0.000 | 3217 | 0559 | 0157 | 0157 | 0157 | 0157 | 9833 | 0.000 | 0.000 | 0.000 | 7274 | 6148 | 7274 | 6148 | 7274 | 6148 | 7274 | 6148 | 7274 | 6148 | 7274 | 6148 | 7274 | 6148 | 7274 | 6148 | | |
| 50 | -5.87 | -2.74 | 9.79 | 37.06 | 49.57 | 0.000 | 3185 | 0323 | 0099 | 0099 | 0099 | 0099 | 9911 | 0.000 | 0.000 | 0.000 | 6912 | 5927 | 6912 | 5927 | 6912 | 5927 | 6912 | 5927 | 6912 | 5927 | 6912 | 5927 | 6912 | 5927 | 6912 | 5927 | | |
| 70 | -6.72 | -3.48 | 9.68 | 36.63 | 49.85 | 0.000 | 3491 | 0372 | 0123 | 0123 | 0123 | 0123 | 9905 | 0.000 | 0.000 | 0.000 | 6638 | 5560 | 6638 | 5560 | 6638 | 5560 | 6638 | 5560 | 6638 | 5560 | 6638 | 5560 | 6638 | 5560 | 6638 | 5560 | | |
| 85 | -5.27 | -1.96 | 17.27 | 32.69 | 51.96 | 0.000 | 3815 | 1094 | 0382 | 0382 | 0382 | 0382 | 9703 | 0.000 | 0.000 | 0.000 | 6880 | 5465 | 6880 | 5465 | 6880 | 5465 | 6880 | 5465 | 6880 | 5465 | 6880 | 5465 | 6880 | 5465 | 6880 | 5465 | | |
| 90 | -4.01 | -0.68 | 20.48 | 32.37 | 53.52 | 0.000 | 3932 | 1200 | 0426 | 0426 | 0426 | 0426 | 9670 | 0.000 | 0.000 | 0.000 | 6946 | 5446 | 6946 | 5446 | 6946 | 5446 | 6946 | 5446 | 6946 | 5446 | 6946 | 5446 | 6946 | 5446 | 6946 | 5446 | | |
| 95 | -2.83 | .53 | 21.34 | 35.22 | 56.00 | 0.001 | 4330 | 1257 | 0453 | 0453 | 0453 | 0453 | 9673 | 0.000 | 0.000 | 0.000 | 6718 | 5115 | 6718 | 5115 | 6718 | 5115 | 6718 | 5115 | 6718 | 5115 | 6718 | 5115 | 6718 | 5115 | 6718 | 5115 | | |
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BLADE-ELEMENT AND OVERALL PERFORMANCE WITH UNIFORM INLET
88 PERCENT OF DESIGN SPEED

Rotor

| %SPAN | DIA-1 IN | DIA-2 IN | V-1 FT/SEC | V-2 FT/SEC | VM-1 FT/SEC | VM-2 FT/SEC | V0-1 FT/SEC | V0-2 FT/SEC | B-1 DEGREE | B-2 DEGREE | B1-1 DEGREE | B1-2 DEGREE | V1-1 FT/SEC | V1-2 FT/SEC | V01-1 FT/SEC | V01-2 FT/SEC | U-1 FT/SEC | U-2 FT/SEC |
|-------|----------------|----------------|---------------|----------------|------------------|------------------|------------------|-----------------|-------------------|---------------|----------------|----------------|----------------|----------------|-----------------|-----------------|---------------|---------------|
| 5 | 17.467 | 19.769 | 490.9 | 895.9 | 490.9 | 602.2 | .0 | 663.3 | .00 | 47.76 | 56.45 | 16.16 | 888.2 | 627.0 | -740.2 | -174.5 | 740.2 | 837.7 |
| 10 | 18.467 | 20.408 | 502.4 | 850.7 | 502.4 | 579.0 | .0 | 623.2 | .00 | 47.10 | 57.30 | 22.64 | 930.0 | 627.8 | -782.6 | -241.6 | 782.6 | 864.8 |
| 15 | 19.467 | 21.047 | 512.7 | 804.8 | 512.7 | 554.5 | .0 | 583.2 | .00 | 46.44 | 58.14 | 29.07 | 971.3 | 635.0 | -824.9 | -308.7 | 824.9 | 891.9 |
| 30 | 22.314 | 22.964 | 534.5 | 748.5 | 534.5 | 535.4 | .0 | 523.1 | .00 | 44.33 | 60.52 | 40.02 | 1086.2 | 699.6 | -945.6 | -450.0 | 945.6 | 973.1 |
| 50 | 25.791 | 25.520 | 545.5 | 707.8 | 545.5 | 524.0 | .0 | 475.9 | .00 | 42.24 | 63.47 | 49.12 | 1221.5 | 800.9 | -1022.9 | -603.6 | 1022.9 | 1081.4 |
| 70 | 28.954 | 28.076 | 539.6 | 663.0 | 539.6 | 499.2 | .0 | 436.4 | .00 | 41.16 | 66.26 | 56.46 | 1340.4 | 903.8 | -1227.0 | -753.4 | 1227.0 | 1189.8 |
| 85 | 31.295 | 29.993 | 524.3 | 681.9 | 524.3 | 496.1 | .0 | 467.8 | .00 | 43.32 | 68.43 | 58.30 | 1426.0 | 944.0 | -1326.2 | -803.2 | 1326.2 | 1271.0 |
| 90 | 31.883 | 30.630 | 519.1 | 681.5 | 519.1 | 478.0 | .0 | 485.7 | .00 | 45.46 | 68.98 | 59.52 | 1447.4 | 942.5 | -1351.1 | -812.3 | 1351.1 | 1298.0 |
| 95 | 32.499 | 31.271 | 513.8 | 651.1 | 513.8 | 432.0 | .0 | 487.2 | .00 | 48.44 | 69.54 | 62.73 | 1469.9 | 942.8 | -1377.2 | -838.0 | 1377.2 | 1325.1 |
| %SPAN | INCS DEGREE | INCM DEGREE | DEV DEGREE | TURN DEGREE | CAMBER DEGREE | OMEGA-B SHOCK | D-FAC OMEGA-B | LOSS-P TOTAL | LOSS-P PROFILE | PO2/ PO1 | EFF-P TOTAL | EFF-P TOTAL | EFF-P TOTAL | EFF-P TOTAL | M-1 | M-2 | M1-1 | M1-2 |
| 5 | 1.05 | 7.48 | 14.29 | 40.29 | 47.12 | .0069 | .4682 | .0022 | .0005 | .0010 | 1.7731 | .9989 | .9967 | .9961 | .4493 | .7833 | .8146 | .5482 |
| 10 | 1.30 | 7.68 | 13.01 | 34.65 | 39.98 | .0089 | .4868 | .0301 | .0064 | .0045 | 1.7277 | .9791 | .9773 | .9687 | .4612 | .7412 | .8576 | .5470 |
| 15 | 1.59 | 7.48 | 12.54 | 29.07 | 34.02 | .0109 | .4961 | .0508 | .0107 | .0083 | 1.6818 | .9619 | .9589 | .9447 | .4709 | .6992 | .8968 | .5517 |
| 30 | 2.59 | 6.60 | 10.29 | 20.50 | 24.19 | .0174 | .4875 | .0598 | .0123 | .0087 | 1.6500 | .9452 | .9411 | .9303 | .4906 | .6471 | 1.0010 | .6048 |
| 50 | 3.85 | 6.52 | 6.78 | 14.35 | 14.62 | .0318 | .4626 | .0726 | .0145 | .0081 | 1.6365 | .9204 | .9146 | .9070 | .5006 | .6088 | 1.1212 | .6888 |
| 70 | 4.77 | 6.62 | 5.88 | 9.80 | 9.06 | .0483 | .4342 | .0933 | .0174 | .0085 | 1.6108 | .8835 | .8754 | .8717 | .4951 | .5673 | 1.2262 | .7733 |
| 85 | 5.05 | 6.34 | 4.10 | 10.13 | 7.93 | .0607 | .4544 | .1541 | .0294 | .0179 | 1.6439 | .8130 | .7992 | .7895 | .4821 | .5782 | 1.2980 | .8005 |
| 90 | 5.13 | 6.23 | 4.36 | 9.46 | 7.60 | .0653 | .4702 | .1918 | .0359 | .0238 | 1.6476 | .7740 | .7574 | .7469 | .4763 | .5749 | 1.3207 | .7951 |
| 95 | 5.31 | 6.23 | 6.83 | 6.82 | 7.41 | .0725 | .4807 | .2253 | .0386 | .0264 | 1.6213 | .7330 | .7142 | .7104 | .4708 | .5466 | 1.3422 | .7914 |

TO/TO PO/PO EFF-AD EFF-P

INLET INLET INLET INLET

1.1739 1.6495 88.32 89.13

STA-1 STA-2

---LOCAL---

8.0 9.0

Stator

| %SPAN | DIA-1 IN | DIA-2 IN | V-1 FT/SEC | V-2 FT/SEC | VM-1 FT/SEC | VM-2 FT/SEC | V0-1 FT/SEC | V0-2 FT/SEC | B-1 DEGREE | B-2 DEGREE | B1-1 DEGREE | B1-2 DEGREE | V1-1 FT/SEC | V1-2 FT/SEC | V01-1 FT/SEC | V01-2 FT/SEC | U-1 FT/SEC | U-2 FT/SEC |
|-------|----------------|----------------|---------------|----------------|------------------|------------------|------------------|-----------------|-------------------|---------------|----------------|----------------|----------------|----------------|-----------------|-----------------|---------------|---------------|
| 5 | 20.409 | 21.489 | 943.9 | 741.6 | 691.5 | 741.6 | 642.5 | -17.2 | 42.90 | -1.33 | 17.82 | 51.36 | 726.4 | 1187.8 | -222.4 | -927.8 | 864.9 | 910.6 |
| 10 | 21.008 | 21.961 | 900.5 | 703.4 | 666.6 | 702.8 | 605.3 | -29.1 | 42.24 | -2.38 | 23.14 | 53.78 | 725.3 | 1189.8 | -284.9 | -959.7 | 890.2 | 930.6 |
| 15 | 21.589 | 22.432 | 857.4 | 675.6 | 641.9 | 674.9 | 568.4 | -31.2 | 41.52 | -2.64 | 28.34 | 55.49 | 729.7 | 1191.5 | -346.5 | -981.8 | 914.9 | 950.6 |
| 30 | 23.314 | 23.902 | 807.2 | 660.1 | 621.3 | 659.9 | 515.3 | -17.5 | 39.67 | -1.52 | 37.24 | 57.36 | 780.8 | 1223.6 | -472.6 | -1030.3 | 988.0 | 1012.9 |
| 50 | 25.601 | 25.893 | 776.5 | 644.8 | 614.7 | 644.5 | 474.5 | -21.7 | 37.66 | -1.93 | 44.78 | 60.05 | 866.4 | 1291.3 | -610.4 | -1118.9 | 1084.9 | 1097.2 |
| 70 | 27.818 | 27.902 | 751.8 | 612.0 | 609.0 | 610.6 | 440.8 | -40.2 | 35.90 | -3.77 | 50.47 | 63.46 | 956.9 | 1366.6 | -738.1 | -1222.6 | 1178.8 | 1182.4 |
| 85 | 29.408 | 29.382 | 791.3 | 617.6 | 629.1 | 617.4 | 480.0 | 15.8 | 37.34 | 1.46 | 50.61 | 63.33 | 991.4 | 1375.7 | -766.2 | -1229.3 | 1246.2 | 1245.1 |
| 90 | 29.914 | 29.856 | 789.3 | 621.9 | 623.1 | 620.7 | 500.7 | 37.8 | 38.79 | 3.49 | 50.91 | 63.17 | 988.1 | 1375.4 | -766.9 | -1227.4 | 1267.6 | 1265.2 |
| 95 | 30.382 | 30.293 | 781.3 | 593.0 | 598.9 | 592.3 | 501.7 | 29.2 | 39.96 | 2.82 | 52.69 | 64.72 | 987.9 | 1387.3 | -785.7 | -1254.5 | 1287.5 | 1283.7 |
| %SPAN | INCS DEGREE | INCM DEGREE | DEV DEGREE | TURN DEGREE | CAMBER DEGREE | OMEGA-B SHOCK | D-FAC OMEGA-B | LOSS-P TOTAL | LOSS-P PROFILE | PO2/ PO1 | EFF-P TOTAL | EFF-P TOTAL | EFF-P TOTAL | EFF-P TOTAL | M-1 | M-2 | M1-1 | M1-2 |
| 5 | -3.04 | -1.12 | 11.08 | 44.22 | 55.90 | .0000 | .3836 | .1488 | .0370 | .0370 | .9458 | .0000 | .0000 | .6908 | .8189 | .6365 | .6338 | 1.0192 |
| 10 | -3.05 | -1.12 | 9.06 | 44.62 | 53.88 | .0001 | .3950 | .1449 | .0370 | .0369 | .9511 | .0000 | .0000 | .7196 | .7780 | .6031 | .6358 | 1.0201 |
| 15 | -2.92 | .03 | 8.28 | 44.16 | 52.41 | .0001 | .3917 | .1170 | .0306 | .0305 | .9636 | .0000 | .0000 | .7517 | .7458 | .5789 | .6408 | 1.0208 |
| 30 | -2.78 | .22 | 9.71 | 41.19 | 50.68 | .0003 | .3653 | .0568 | .0165 | .0164 | .9835 | .0000 | .0000 | .8494 | .7016 | .5655 | .6817 | 1.0482 |
| 50 | -3.01 | .12 | 10.10 | 39.59 | 49.57 | .0005 | .3643 | .0350 | .0107 | .0105 | .9908 | .0000 | .0000 | .9030 | .6725 | .5511 | .7517 | 1.1037 |
| 70 | -3.71 | -.47 | 9.68 | 39.66 | 49.84 | .0002 | .3978 | .0421 | .0139 | .0139 | .9896 | .0000 | .0000 | .8856 | .6494 | .5211 | .8265 | 1.1636 |
| 85 | -2.06 | 1.25 | 17.35 | 35.88 | 51.96 | .0012 | .4247 | .1129 | .0395 | .0390 | .9700 | .0000 | .0000 | .7565 | .6783 | .5204 | .8499 | 1.1591 |
| 90 | -.73 | 2.59 | 20.92 | 35.30 | 53.56 | .0022 | .4280 | .1115 | .0395 | .0387 | .9702 | .0000 | .0000 | .7674 | .6824 | .5216 | .8439 | 1.1536 |
| 95 | .26 | 3.63 | 22.51 | 37.13 | 56.00 | .0018 | .4593 | .1171 | .0422 | .0415 | .9700 | .0000 | .0000 | .7631 | .6654 | .4953 | .8398 | 1.1587 |

NCORR WCORR TO/TO PO/PO EFF-AD EFF-P WCI/A1

INLET INLET INLET INLET LBM/SEC

RPM LBM/SEC

9742. 158.05 1.1739 1.6132 84.12 85.18 35.48

SOFT

STA-1 STA-2

---LOCAL---

10.0 11.0

BLADE-ELEMENT AND OVERALL PERFORMANCE WITH UNIFORM INLET
88 PERCENT OF DESIGN SPEED

Rotor

| %SPAN | DIA-1 IN | DIA-2 IN | V-1 FT/SEC | V-2 FT/SEC | VM-1 FT/SEC | VM-2 FT/SEC | V0-1 FT/SEC | V0-2 FT/SEC | B-1 DEGREE | B-2 DEGREE | B*-1 DEGREE | B*-2 DEGREE | V*-1 FT/SEC | V*-2 FT/SEC | V0*-1 FT/SEC | V0*-2 FT/SEC | U-1 FT/SEC | U-2 FT/SEC |
|-------|-------------|-------------|---------------|---------------|----------------|----------------|----------------|----------------|---------------|---------------|----------------|----------------|----------------|----------------|-----------------|-----------------|---------------|---------------|
| 5 | 17.467 | 19.769 | 479.4 | 894.4 | 479.4 | 591.5 | 0 | 670.9 | 0.00 | 48.60 | 57.07 | 15.77 | 882.0 | 614.7 | -740.3 | -167.0 | 740.3 | 837.9 |
| 10 | 18.467 | 20.408 | 490.7 | 850.7 | 490.7 | 569.6 | 0 | 631.9 | 0.00 | 47.96 | 57.92 | 22.24 | 923.8 | 615.9 | -782.7 | -233.1 | 782.7 | 865.0 |
| 15 | 19.467 | 21.047 | 500.7 | 811.4 | 500.7 | 553.1 | 0 | 593.7 | 0.00 | 47.02 | 58.75 | 28.31 | 965.1 | 629.0 | -825.1 | -298.3 | 825.1 | 892.1 |
| 30 | 22.314 | 22.964 | 521.0 | 741.8 | 521.0 | 514.6 | 0 | 534.3 | 0.00 | 44.07 | 61.15 | 40.43 | 1079.8 | 676.7 | -945.8 | -439.0 | 945.8 | 973.3 |
| 50 | 25.791 | 25.920 | 530.0 | 707.7 | 530.0 | 508.4 | 0 | 492.3 | 0.00 | 44.08 | 64.13 | 49.20 | 1214.9 | 778.5 | -1093.1 | -589.4 | 1093.1 | 1081.6 |
| 70 | 28.954 | 28.776 | 523.0 | 669.6 | 523.0 | 485.3 | 0 | 461.3 | 0.00 | 43.55 | 66.92 | 56.33 | 1334.0 | 875.5 | -1227.2 | -728.7 | 1227.2 | 1190.0 |
| 85 | 31.295 | 29.993 | 507.5 | 687.0 | 507.5 | 476.3 | 0 | 435.1 | 0.00 | 40.11 | 69.06 | 58.46 | 1420.2 | 910.6 | -1326.4 | -776.1 | 1326.4 | 1271.2 |
| 90 | 31.883 | 30.630 | 502.6 | 684.7 | 502.6 | 453.6 | 0 | 512.9 | 0.00 | 48.52 | 69.60 | 59.99 | 1441.8 | 906.9 | -1351.3 | -785.3 | 1351.3 | 1298.2 |
| 95 | 32.499 | 31.271 | 497.5 | 662.3 | 497.5 | 414.7 | 0 | 516.3 | 0.00 | 51.23 | 70.14 | 62.86 | 1464.5 | 909.2 | -1377.4 | -809.1 | 1377.4 | 1325.4 |

TO/TO PO/PO EFF-AD EFF-P

INLET INLET INLET INLET

1.1806 1.6735 87.68 88.56

Stator

| %SPAN | DIA-1 IN | DIA-2 IN | V-1 FT/SEC | V-2 FT/SEC | VM-1 FT/SEC | VM-2 FT/SEC | V0-1 FT/SEC | V0-2 FT/SEC | B-1 DEGREE | B-2 DEGREE | B*-1 DEGREE | B*-2 DEGREE | V*-1 FT/SEC | V*-2 FT/SEC | V0*-1 FT/SEC | V0*-2 FT/SEC | U-1 FT/SEC | U-2 FT/SEC |
|-------|-------------|-------------|---------------|---------------|----------------|----------------|----------------|----------------|---------------|---------------|----------------|----------------|----------------|----------------|-----------------|-----------------|---------------|---------------|
| 5 | 20.409 | 21.489 | 937.8 | 711.8 | 676.1 | 711.7 | 649.9 | -12.2 | 43.87 | -9.8 | 17.65 | 52.36 | 709.5 | 1165.5 | -215.2 | -923.0 | 865.0 | 910.8 |
| 10 | 21.008 | 21.961 | 895.3 | 673.0 | 651.8 | 672.2 | 613.8 | -31.6 | 43.28 | -2.71 | 22.99 | 55.06 | 708.4 | 1174.2 | -276.6 | -962.4 | 890.4 | 930.8 |
| 15 | 21.589 | 22.432 | 858.0 | 643.5 | 633.4 | 642.4 | 578.6 | -37.3 | 42.41 | -3.32 | 27.96 | 56.97 | 717.6 | 1178.6 | -336.4 | -988.0 | 915.0 | 950.8 |
| 30 | 23.314 | 23.902 | 794.9 | 625.8 | 595.7 | 625.4 | 526.3 | -22.3 | 41.46 | -2.04 | 37.76 | 58.86 | 754.0 | 1209.6 | -461.8 | -1035.3 | 988.1 | 1013.1 |
| 50 | 25.601 | 25.893 | 770.2 | 616.5 | 593.3 | 616.2 | 491.0 | -19.3 | 39.61 | -1.80 | 45.02 | 61.11 | 839.8 | 1275.5 | -524.1 | -1116.8 | 1085.1 | 1097.4 |
| 70 | 27.818 | 27.902 | 751.5 | 589.1 | 588.8 | 588.0 | 467.0 | -36.2 | 38.42 | -3.52 | 50.41 | 64.25 | 924.0 | 1353.2 | -712.1 | -1218.8 | 1179.0 | 1182.6 |
| 85 | 29.408 | 29.382 | 787.8 | 597.4 | 602.4 | 597.2 | 507.7 | 15.5 | 40.12 | 1.48 | 50.80 | 64.10 | 953.2 | 1367.2 | -738.7 | -1229.8 | 1246.4 | 1245.3 |
| 90 | 29.914 | 29.856 | 793.2 | 598.7 | 591.9 | 597.5 | 528.1 | 37.0 | 41.74 | 3.54 | 51.34 | 64.06 | 947.4 | 1366.0 | -739.8 | -1228.4 | 1267.9 | 1265.4 |
| 95 | 30.362 | 30.293 | 781.6 | 577.1 | 572.8 | 576.2 | 531.8 | 32.2 | 42.88 | 3.20 | 52.85 | 65.28 | 948.4 | 1378.0 | -755.9 | -1251.7 | 1287.7 | 1283.9 |

INCORR W CORR TO/TO PO/PO EFF-AD EFF-P WC1/A1

INLET INLET INLET INLET INLET LBM/SEC

RPM LBM/SEC % SQFT

9714. 154.61 1.1806 1.6351 83.44 84.57 34.71

STA-1 STA-2

---LOCAL---

10.0 11.0

BLADE-ELEMENT AND OVERALL PERFORMANCE WITH UNIFORM INLET
88 PERCENT OF DESIGN SPEED

Rotor

| % SPAN | DIA-1 IN | DIA-2 IN | V-1 FT/SEC | V-2 FT/SEC | VM-1 FT/SEC | VM-2 FT/SEC | V0-1 FT/SEC | V0-2 FT/SEC | B-1 DEGREE | B-2 DEGREE | B*-1 DEGREE | B*-2 DEGREE | V*-1 FT/SEC | V*-2 FT/SEC | V0*-1 FT/SEC | V0*-2 FT/SEC | U-1 FT/SEC | U-2 FT/SEC |
|--------|-------------|-------------|---------------|---------------|----------------|----------------|----------------|----------------|---------------|---------------|----------------|----------------|----------------|----------------|-----------------|-----------------|---------------|---------------|
| 5 | 17.467 | 19.769 | 468.3 | 893.1 | 468.3 | 580.7 | .0 | 678.6 | .00 | 49.45 | 57.69 | 15.36 | 876.1 | 602.2 | -740.5 | -159.5 | 740.5 | 838.0 |
| 10 | 18.467 | 20.408 | 479.2 | 852.5 | 479.2 | 566.5 | .0 | 637.0 | .00 | 48.35 | 58.53 | 21.92 | 917.9 | 611.1 | -782.8 | -159.5 | 782.8 | 865.1 |
| 15 | 19.467 | 21.047 | 489.0 | 816.5 | 489.0 | 552.8 | .0 | 600.9 | .00 | 47.39 | 59.35 | 27.77 | 959.3 | 625.4 | -825.2 | -291.3 | 825.2 | 892.2 |
| 30 | 22.314 | 22.964 | 508.2 | 741.5 | 508.2 | 503.3 | .0 | 544.4 | .00 | 47.24 | 61.75 | 40.39 | 1073.8 | 661.7 | -945.9 | -429.0 | 945.9 | 973.5 |
| 50 | 25.791 | 25.520 | 515.3 | 713.3 | 515.3 | 503.2 | .0 | 505.5 | .00 | 45.13 | 64.76 | 48.85 | 1208.7 | 765.3 | -1093.3 | -576.3 | 1093.3 | 1081.8 |
| 70 | 28.954 | 28.076 | 506.0 | 678.8 | 506.0 | 470.0 | .0 | 489.8 | .00 | 46.18 | 67.59 | 56.13 | 1327.6 | 843.5 | -1227.4 | -700.4 | 1227.4 | 1190.2 |
| 85 | 31.295 | 29.993 | 490.2 | 689.7 | 490.2 | 449.4 | .0 | 523.2 | .00 | 49.34 | 69.72 | 59.01 | 1414.3 | 872.8 | -1326.6 | -748.2 | 1326.6 | 1271.4 |
| 90 | 31.883 | 30.630 | 485.6 | 685.4 | 485.6 | 423.3 | .0 | 539.0 | .00 | 51.86 | 70.24 | 60.87 | 1436.2 | 869.5 | -1351.6 | -759.4 | 1351.6 | 1298.5 |
| 95 | 32.409 | 31.271 | 481.0 | 670.1 | 481.0 | 404.1 | .0 | 534.6 | .00 | 52.92 | 70.75 | 62.94 | 1459.2 | 888.3 | -1377.7 | -791.0 | 1377.7 | 1325.6 |

| % SPAN | INCS DEGREE | INCM DEGREE | DEV DEGREE | TURN DEGREE | CAMBER DEGREE | OMEGA-B SHOCK | D-FAC SHOCK | OMEGA-B SHOCK | LOSS-P TOTAL | LOSS-P PROFILE | PO2/ PO1 | EFF-P TOTAL | EFF-P STATIC | M*-1 | M*-2 | M*-1 | M*-2 |
|--------|----------------|----------------|---------------|----------------|------------------|------------------|----------------|------------------|-----------------|-------------------|-------------|----------------|-----------------|--------|-------|-------|--------|
| 5 | 2.29 | 8.72 | 13.49 | 42.33 | 47.12 | .0095 | .4933 | -.0157 | -.0033 | -.0053 | 1.8055 | 1.0068 | 1.0074 | 1.0145 | .4280 | .7790 | .8028 |
| 10 | 2.54 | 8.90 | 12.26 | 36.61 | 39.96 | .0117 | .5018 | -.0020 | -.0004 | -.0030 | 1.7677 | .9994 | .9993 | 1.0004 | .4394 | .7416 | .8464 |
| 15 | 2.83 | 8.65 | 11.23 | 31.58 | 34.00 | .0140 | .5044 | .0093 | .0020 | .0010 | 1.7353 | .9918 | .9911 | .9884 | .4487 | .7087 | .8867 |
| 30 | 3.88 | 7.85 | 10.67 | 21.36 | 24.19 | .0211 | .5233 | .0716 | .0147 | .0103 | 1.6751 | .9383 | .9335 | .9205 | .4657 | .6386 | .9915 |
| 50 | 5.18 | 7.03 | 6.57 | 15.91 | 14.56 | .0351 | .4937 | .0876 | .0176 | .0105 | 1.6748 | .9110 | .9041 | .8924 | .4714 | .6109 | 1.1101 |
| 70 | 6.12 | 7.94 | 5.59 | 11.46 | 9.11 | .0520 | .4875 | .1433 | .0270 | .0172 | 1.6568 | .8409 | .8289 | .8173 | .4626 | .5764 | 1.2149 |
| 85 | 6.35 | 7.62 | 4.86 | 10.71 | 7.98 | .0645 | .5141 | .2114 | .0394 | .0276 | 1.6821 | .7675 | .7499 | .7321 | .4490 | .5795 | 1.2857 |
| 90 | 6.39 | 7.49 | 5.72 | 9.37 | 7.61 | .0691 | .5303 | .2474 | .0445 | .0322 | 1.6822 | .7331 | .7128 | .6955 | .4440 | .5728 | 1.3077 |
| 95 | 6.53 | 7.45 | 7.05 | 7.82 | 7.42 | .0763 | .5262 | .2590 | .0443 | .0313 | 1.6734 | .7177 | .6964 | .6824 | .4394 | .5586 | 1.3290 |

STA-1 STA-2
---LOCAL---

8.0 9.0

Stator

| % SPAN | DIA-1 IN | DIA-2 IN | V-1 FT/SEC | V-2 FT/SEC | VM-1 FT/SEC | VM-2 FT/SEC | V0-1 FT/SEC | V0-2 FT/SEC | B-1 DEGREE | B-2 DEGREE | B*-1 DEGREE | B*-2 DEGREE | V*-1 FT/SEC | V*-2 FT/SEC | V0*-1 FT/SEC | V0*-2 FT/SEC | U-1 FT/SEC | U-2 FT/SEC |
|--------|-------------|-------------|---------------|---------------|----------------|----------------|----------------|----------------|---------------|---------------|----------------|----------------|----------------|----------------|-----------------|-----------------|---------------|---------------|
| 5 | 20.409 | 21.489 | 933.0 | 690.7 | 662.1 | 690.7 | 657.4 | .0 | 74.79 | -.22 | 17.43 | 52.91 | 693.9 | 1145.3 | -207.8 | -913.6 | 865.2 | 911.0 |
| 10 | 21.008 | 21.961 | 893.2 | 653.6 | 644.0 | 653.0 | 653.0 | .0 | 74.79 | -.23 | 17.43 | 52.91 | 693.9 | 1145.3 | -207.8 | -913.6 | 865.2 | 911.0 |
| 15 | 21.589 | 22.432 | 858.6 | 624.6 | 627.8 | 623.6 | 623.6 | .0 | 74.79 | -.23 | 17.43 | 52.91 | 693.9 | 1145.3 | -207.8 | -913.6 | 865.2 | 911.0 |
| 30 | 23.314 | 23.902 | 789.9 | 600.8 | 579.9 | 600.3 | 595.3 | .0 | 74.79 | -.23 | 17.43 | 52.91 | 693.9 | 1145.3 | -207.8 | -913.6 | 865.2 | 911.0 |
| 50 | 25.601 | 25.893 | 770.4 | 597.4 | 582.3 | 597.0 | 594.3 | .0 | 74.79 | -.23 | 17.43 | 52.91 | 693.9 | 1145.3 | -207.8 | -913.6 | 865.2 | 911.0 |
| 70 | 27.818 | 27.902 | 754.4 | 572.7 | 568.5 | 571.9 | 565.9 | .0 | 74.79 | -.23 | 17.43 | 52.91 | 693.9 | 1145.3 | -207.8 | -913.6 | 865.2 | 911.0 |
| 85 | 29.408 | 29.382 | 782.4 | 578.2 | 569.7 | 578.0 | 578.0 | .0 | 74.79 | -.23 | 17.43 | 52.91 | 693.9 | 1145.3 | -207.8 | -913.6 | 865.2 | 911.0 |
| 90 | 29.914 | 29.856 | 785.4 | 575.0 | 555.9 | 574.3 | 553.8 | .0 | 74.79 | -.23 | 17.43 | 52.91 | 693.9 | 1145.3 | -207.8 | -913.6 | 865.2 | 911.0 |
| 95 | 30.362 | 30.293 | 779.1 | 559.3 | 551.4 | 558.5 | 550.4 | .0 | 74.79 | -.23 | 17.43 | 52.91 | 693.9 | 1145.3 | -207.8 | -913.6 | 865.2 | 911.0 |

| % SPAN | INCS DEGREE | INCM DEGREE | DEV DEGREE | TURN DEGREE | CAMBER DEGREE | OMEGA-B SHOCK | D-FAC SHOCK | OMEGA-B SHOCK | LOSS-P TOTAL | LOSS-P PROFILE | PO2/ PO1 | EFF-P TOTAL | EFF-P STATIC | M*-1 | M*-2 | M*-1 | M*-2 |
|--------|----------------|----------------|---------------|----------------|------------------|------------------|----------------|------------------|-----------------|-------------------|-------------|----------------|-----------------|-------|-------|-------|--------|
| 5 | -1.19 | 1.74 | 12.19 | 45.02 | 55.90 | .0005 | .4311 | .3325 | .0404 | .0403 | .9422 | .0000 | .7105 | .8076 | .5884 | .6042 | .9757 |
| 10 | -1.53 | 1.40 | 9.06 | 46.23 | 53.87 | .0005 | .4489 | .3350 | .0421 | .0419 | .9452 | .0000 | .7210 | .7737 | .5565 | .6136 | .9873 |
| 15 | -1.34 | 1.60 | 7.64 | 46.30 | 52.41 | .0007 | .4587 | .3312 | .0421 | .0419 | .9499 | .0000 | .7157 | .7460 | .5313 | .6195 | .9930 |
| 30 | .32 | 3.31 | 8.98 | 45.00 | 50.67 | .0026 | .4360 | .328 | .0204 | .0197 | .9804 | .0000 | .8533 | .6842 | .5104 | .6363 | 1.0177 |
| 50 | .15 | 3.28 | 9.88 | 43.04 | 49.59 | .0041 | .4329 | .459 | .0140 | .0128 | .9883 | .0000 | .9098 | .6648 | .5062 | .7072 | 1.0754 |
| 70 | 1.32 | 4.55 | 10.45 | 44.08 | 49.86 | .0074 | .4716 | .452 | .0125 | .0125 | .9890 | .0000 | .9376 | .6444 | .4819 | .7596 | 1.1282 |
| 85 | 3.69 | 7.00 | 17.56 | 41.60 | 51.99 | .0148 | .4931 | .503 | .0316 | .0264 | .9769 | .0000 | .8503 | .6630 | .4811 | .7726 | 1.1299 |
| 90 | 5.27 | 8.59 | 20.26 | 42.03 | 53.59 | .0194 | .5060 | .584 | .0399 | .0280 | .9749 | .0000 | .8298 | .6634 | .4760 | .7646 | 1.1204 |
| 95 | 5.32 | 8.68 | 22.63 | 42.00 | 56.00 | .0144 | .5240 | .119 | .0403 | .0351 | .9719 | .0000 | .8004 | .6571 | .4619 | .7744 | 1.1349 |

STA-1 STA-2
---LOCAL---

10.0 11.0

TABLE 8.6

BLADE-ELEMENT AND OVERALL PERFORMANCE WITH UNIFORM INLET 88 PERCENT OF DESIGN SPEED

Rotor

| %SPAN | DIA-1 IN | DIA-2 IN | V-1 FT/SEC | V-2 FT/SEC | VM-1 FT/SEC | VM-2 FT/SEC | V0-1 FT/SEC | V0-2 FT/SEC | B-1 DEGREE | B-2 DEGREE | B*-1 DEGREE | B*-2 DEGREE | V*-1 FT/SEC | V*-2 FT/SEC | V0*-1 FT/SEC | V0*-2 FT/SEC | U-1 FT/SEC | U-2 FT/SEC |
|-------|-------------|-------------|---------------|---------------|----------------|----------------|----------------|----------------|---------------|---------------|----------------|----------------|----------------|----------------|-----------------|-----------------|---------------|---------------|
| 5 | 17.467 | 19.769 | 456.9 | 896.2 | 456.9 | 578.1 | .0 | 684.8 | .00 | 49.83 | 58.31 | 14.80 | 869.7 | 598.0 | -740.0 | -182.8 | 740.0 | 837.6 |
| 10 | 18.467 | 20.408 | 467.6 | 854.4 | 467.6 | 561.2 | .0 | 644.3 | .00 | 48.94 | 59.14 | 21.42 | 911.5 | 603.4 | -824.4 | -220.4 | 782.4 | 854.6 |
| 15 | 19.467 | 21.047 | 477.0 | 817.6 | 477.0 | 543.4 | .0 | 609.1 | .00 | 48.15 | 59.96 | 27.37 | 952.8 | 615.0 | -824.4 | -282.6 | 824.8 | 891.7 |
| 30 | 22.314 | 22.964 | 495.1 | 740.9 | 495.1 | 495.6 | .0 | 550.7 | .00 | 48.01 | 62.36 | 40.37 | 1067.2 | 651.5 | -945.4 | -422.2 | 945.4 | 972.9 |
| 50 | 25.791 | 25.520 | 500.6 | 716.1 | 500.6 | 496.0 | .0 | 516.4 | .00 | 48.00 | 65.38 | 48.69 | 1201.9 | 752.0 | -1092.7 | -564.8 | 1092.7 | 1081.2 |
| 70 | 28.954 | 28.076 | 489.6 | 689.5 | 489.6 | 453.0 | .0 | 519.8 | .00 | 48.93 | 68.24 | 55.92 | 1320.8 | 808.5 | -1226.7 | -669.7 | 1226.7 | 1169.5 |
| 85 | 31.295 | 29.993 | 474.1 | 687.5 | 474.1 | 422.3 | .0 | 542.5 | .00 | 52.10 | 70.32 | 59.89 | 1408.1 | 841.8 | -1325.9 | -728.2 | 1325.9 | 1270.7 |
| 90 | 31.803 | 30.630 | 469.8 | 683.6 | 469.8 | 405.7 | .0 | 550.2 | .00 | 53.59 | 70.82 | 61.51 | 1430.2 | 850.6 | -1350.8 | -747.5 | 1350.8 | 1297.7 |
| 95 | 32.499 | 31.271 | 465.4 | 675.9 | 465.4 | 399.6 | .0 | 545.2 | .00 | 53.76 | 71.33 | 62.86 | 1453.4 | 876.1 | -1376.9 | -779.7 | 1376.9 | 1324.9 |

TO/TO PO/PO EFF-AD EFF-P

INLET INLET INLET INLET

1.1913 1.6996 85.44 86.51

Stator

| %SPAN | DIA-1 IN | DIA-2 IN | V-1 FT/SEC | V-2 FT/SEC | VM-1 FT/SEC | VM-2 FT/SEC | V0-1 FT/SEC | V0-2 FT/SEC | B-1 DEGREE | B-2 DEGREE | B*-1 DEGREE | B*-2 DEGREE | V*-1 FT/SEC | V*-2 FT/SEC | V0*-1 FT/SEC | V0*-2 FT/SEC | U-1 FT/SEC | U-2 FT/SEC |
|-------|-------------|-------------|---------------|---------------|----------------|----------------|----------------|----------------|---------------|---------------|----------------|----------------|----------------|----------------|-----------------|-----------------|---------------|---------------|
| 5 | 20.409 | 21.489 | 933.6 | 677.2 | 656.9 | 677.2 | 663.4 | -7.7 | 45.28 | -0.6 | 17.04 | 53.38 | 687.0 | 1135.2 | -201.3 | -911.1 | 864.7 | 910.4 |
| 10 | 21.008 | 21.961 | 892.2 | 640.3 | 635.8 | 639.5 | 625.9 | -28.3 | 44.55 | -2.57 | 22.55 | 56.29 | 688.9 | 1152.8 | -264.1 | -950.8 | 890.1 | 930.4 |
| 15 | 21.589 | 22.432 | 856.7 | 609.8 | 617.7 | 608.5 | 593.7 | -39.2 | 43.86 | -3.68 | 27.45 | 58.41 | 696.6 | 1161.8 | -321.0 | -989.6 | 914.7 | 950.4 |
| 30 | 23.314 | 23.902 | 786.0 | 581.2 | 568.7 | 580.9 | 542.5 | -21.3 | 43.65 | -2.10 | 38.02 | 60.67 | 722.6 | 1186.0 | -445.3 | -1034.0 | 987.8 | 1012.7 |
| 50 | 25.601 | 25.893 | 769.3 | 579.7 | 571.2 | 579.4 | 515.3 | -17.8 | 42.06 | -1.76 | 44.90 | 62.53 | 806.7 | 1236.4 | -569.4 | -1114.8 | 1094.7 | 1097.0 |
| 70 | 27.818 | 27.902 | 759.4 | 560.1 | 548.0 | 559.8 | 525.6 | -19.6 | 43.81 | -2.01 | 49.99 | 65.02 | 852.5 | 1325.8 | -652.9 | -1211.8 | 1178.6 | 1182.1 |
| 85 | 29.408 | 29.382 | 774.3 | 556.7 | 539.7 | 556.6 | 555.2 | 7.7 | 45.81 | .79 | 52.00 | 65.78 | 876.6 | 1356.6 | -690.8 | -1237.2 | 1246.3 | 1244.9 |
| 90 | 29.914 | 29.856 | 777.4 | 552.8 | 534.0 | 552.3 | 565.0 | 24.0 | 46.61 | 2.49 | 52.76 | 66.01 | 882.4 | 1358.3 | -702.4 | -1241.0 | 1267.4 | 1264.9 |
| 95 | 30.382 | 30.293 | 777.0 | 544.6 | 537.3 | 544.1 | 561.3 | 24.1 | 46.25 | 2.54 | 53.49 | 66.63 | 903.1 | 1371.9 | -725.9 | -1259.3 | 1287.2 | 1283.4 |

NCORR WCORR TO/TO PO/PO EFF-AD EFF-P WCI/A1

INLET INLET INLET INLET INLET LBM/SEC

9710. 147.66 1.1913 1.6567 81.01 82.34 33.14

STA-1 STA-2

---LOCAL---

10.0 11.0

BLADE-ELEMENT AND OVER-ALL PERFORMANCE WITH UNIFORM INLET
100 PERCENT OF DESIGN SPEED

Rotor

| Rotor | | | | | | | | | | | | | | | | | | | | Stator | | | | | | | | | | | | | | | | | | | |
|----------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|--------|--------|--------|--------|----------------------------|--------|--------|--------|--------|--------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| %SPAN | | | | | | | | | | %SPAN | | | | | | | | | | %SPAN | | | | | | | | | | | | | | | | | | | |
| DIA-1 | DIA-2 | Y-1 | Y-2 | VM-1 | VM-2 | Y0-1 | Y0-2 | B-1 | B-2 | B-1 | B-2 | DEGREE | DEGREE | DEGREE | DEGREE | PO2/ | PO1/ | EFF-P | EFF-P | Y-2 | Y0-1 | Y0-2 | U-1 | U-2 | | | | | | | | | | | | | | | |
| IN | IN | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | DEGREE | DEGREE | DEGREE | DEGREE | TOTAL | TOTAL | LOSS-P | LOSS-P | TOTAL | TOTAL | STATIC | STATIC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | | | | | | | | | | | | | | | |
| 5 | 17.467 | 19.769 | 586.4 | 1042.1 | 586.4 | 738.1 | 0 | 735.7 | 0 | 44.91 | 55.24 | 16.64 | 1028.4 | 770.3 | -844.8 | -220.5 | 844.8 | 956.2 | 586.2 | 586.2 | 586.2 | 586.2 | 586.2 | 586.2 | 586.2 | | | | | | | | | | | | | | |
| 10 | 18.467 | 20.408 | 601.5 | 976.4 | 601.5 | 688.2 | 0 | 682.7 | 0 | 45.19 | 56.04 | 23.19 | 1076.8 | 749.1 | -893.2 | -254.4 | 893.2 | 981.2 | 981.2 | 981.2 | 981.2 | 981.2 | 981.2 | 981.2 | 981.2 | | | | | | | | | | | | | | |
| 15 | 19.467 | 21.047 | 615.0 | 976.4 | 615.0 | 688.2 | 0 | 658.3 | 0 | 45.36 | 56.85 | 29.10 | 1124.8 | 739.3 | -941.6 | -254.4 | 941.6 | 1018.0 | 1018.0 | 1018.0 | 1018.0 | 1018.0 | 1018.0 | 1018.0 | 1018.0 | | | | | | | | | | | | | | |
| 20 | 20.467 | 21.686 | 628.5 | 981.1 | 628.5 | 693.7 | 0 | 632.6 | 0 | 45.53 | 56.85 | 35.01 | 1172.8 | 724.6 | -989.9 | -254.4 | 989.9 | 1065.0 | 1065.0 | 1065.0 | 1065.0 | 1065.0 | 1065.0 | 1065.0 | 1065.0 | | | | | | | | | | | | | | |
| 25 | 21.467 | 22.325 | 642.0 | 986.2 | 642.0 | 699.2 | 0 | 607.1 | 0 | 45.70 | 57.66 | 40.82 | 1220.8 | 710.0 | -1038.2 | -254.4 | 1038.2 | 1112.0 | 1112.0 | 1112.0 | 1112.0 | 1112.0 | 1112.0 | 1112.0 | 1112.0 | | | | | | | | | | | | | | |
| 30 | 22.467 | 22.964 | 655.5 | 991.3 | 655.5 | 704.7 | 0 | 582.6 | 0 | 45.87 | 58.47 | 46.63 | 1268.8 | 695.4 | -1086.5 | -254.4 | 1086.5 | 1188.0 | 1188.0 | 1188.0 | 1188.0 | 1188.0 | 1188.0 | 1188.0 | 1188.0 | | | | | | | | | | | | | | |
| 35 | 23.467 | 23.603 | 669.0 | 996.4 | 669.0 | 710.2 | 0 | 557.1 | 0 | 46.04 | 60.09 | 52.44 | 1316.8 | 680.7 | -1134.8 | -254.4 | 1134.8 | 1253.0 | 1253.0 | 1253.0 | 1253.0 | 1253.0 | 1253.0 | 1253.0 | 1253.0 | | | | | | | | | | | | | | |
| 40 | 24.467 | 24.242 | 682.5 | 1001.5 | 682.5 | 715.7 | 0 | 532.6 | 0 | 46.21 | 60.90 | 58.25 | 1364.8 | 666.0 | -1183.1 | -254.4 | 1183.1 | 1300.0 | 1300.0 | 1300.0 | 1300.0 | 1300.0 | 1300.0 | 1300.0 | 1300.0 | | | | | | | | | | | | | | |
| 45 | 25.467 | 24.881 | 696.0 | 1006.6 | 696.0 | 721.2 | 0 | 507.1 | 0 | 46.38 | 61.71 | 64.06 | 1412.8 | 651.3 | -1231.4 | -254.4 | 1231.4 | 1347.0 | 1347.0 | 1347.0 | 1347.0 | 1347.0 | 1347.0 | 1347.0 | 1347.0 | | | | | | | | | | | | | | |
| 50 | 26.467 | 25.520 | 709.5 | 1011.7 | 709.5 | 726.7 | 0 | 482.6 | 0 | 46.55 | 62.52 | 69.87 | 1460.8 | 636.6 | -1279.7 | -254.4 | 1279.7 | 1394.0 | 1394.0 | 1394.0 | 1394.0 | 1394.0 | 1394.0 | 1394.0 | 1394.0 | | | | | | | | | | | | | | |
| 55 | 27.467 | 26.159 | 723.0 | 1016.8 | 723.0 | 732.2 | 0 | 457.1 | 0 | 46.72 | 63.33 | 75.68 | 1508.8 | 621.9 | -1328.0 | -254.4 | 1328.0 | 1441.0 | 1441.0 | 1441.0 | 1441.0 | 1441.0 | 1441.0 | 1441.0 | 1441.0 | | | | | | | | | | | | | | |
| 60 | 28.467 | 26.798 | 736.5 | 1021.9 | 736.5 | 737.7 | 0 | 432.6 | 0 | 46.89 | 64.14 | 81.49 | 1556.8 | 607.2 | -1376.3 | -254.4 | 1376.3 | 1488.0 | 1488.0 | 1488.0 | 1488.0 | 1488.0 | 1488.0 | 1488.0 | 1488.0 | | | | | | | | | | | | | | |
| 65 | 29.467 | 27.437 | 750.0 | 1027.0 | 750.0 | 743.2 | 0 | 407.7 | 0 | 47.06 | 64.95 | 87.30 | 1604.8 | 592.5 | -1424.6 | -254.4 | 1424.6 | 1535.0 | 1535.0 | 1535.0 | 1535.0 | 1535.0 | 1535.0 | 1535.0 | 1535.0 | | | | | | | | | | | | | | |
| 70 | 30.467 | 28.076 | 763.5 | 1032.1 | 763.5 | 748.7 | 0 | 382.2 | 0 | 47.23 | 65.76 | 93.11 | 1652.8 | 577.8 | -1472.9 | -254.4 | 1472.9 | 1582.0 | 1582.0 | 1582.0 | 1582.0 | 1582.0 | 1582.0 | 1582.0 | 1582.0 | | | | | | | | | | | | | | |
| 75 | 31.467 | 28.715 | 777.0 | 1037.2 | 777.0 | 754.2 | 0 | 357.7 | 0 | 47.40 | 66.57 | 98.92 | 1700.8 | 563.1 | -1521.2 | -254.4 | 1521.2 | 1629.0 | 1629.0 | 1629.0 | 1629.0 | 1629.0 | 1629.0 | 1629.0 | 1629.0 | | | | | | | | | | | | | | |
| 80 | 32.467 | 29.354 | 790.5 | 1042.3 | 790.5 | 759.7 | 0 | 332.2 | 0 | 47.57 | 67.38 | 104.73 | 1748.8 | 548.4 | -1569.5 | -254.4 | 1569.5 | 1676.0 | 1676.0 | 1676.0 | 1676.0 | 1676.0 | 1676.0 | 1676.0 | 1676.0 | | | | | | | | | | | | | | |
| 85 | 33.467 | 30.000 | 804.0 | 1047.4 | 804.0 | 765.2 | 0 | 307.7 | 0 | 47.74 | 68.19 | 110.54 | 1796.8 | 533.7 | -1617.8 | -254.4 | 1617.8 | 1723.0 | 1723.0 | 1723.0 | 1723.0 | 1723.0 | 1723.0 | 1723.0 | 1723.0 | | | | | | | | | | | | | | |
| 90 | 34.467 | 30.640 | 817.5 | 1052.5 | 817.5 | 770.7 | 0 | 282.2 | 0 | 47.91 | 69.00 | 116.35 | 1844.8 | 519.0 | -1666.1 | -254.4 | 1666.1 | 1770.0 | 1770.0 | 1770.0 | 1770.0 | 1770.0 | 1770.0 | 1770.0 | 1770.0 | | | | | | | | | | | | | | |
| 95 | 35.467 | 31.271 | 831.0 | 1057.6 | 831.0 | 776.2 | 0 | 257.7 | 0 | 48.08 | 69.81 | 122.16 | 1892.8 | 504.3 | -1714.3 | -254.4 | 1714.3 | 1817.0 | 1817.0 | 1817.0 | 1817.0 | 1817.0 | 1817.0 | 1817.0 | 1817.0 | | | | | | | | | | | | | | |
| To/To PO/PO EFF-AD EFF-P | | | | | | | | | | | | | | | | | | | | To/To PO/PO EFF-AD EFF-P | | | | | | | | | | | | | | | | | | | |
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TABLE 9.2

BLADE-ELEMENT AND OVERALL PERFORMANCE WITH UNIFORM INLET 100 PERCENT OF DESIGN SPEED

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Rotor

| %SPAN | DIA-1 IN | DIA-2 IN | FT/SEC | Y-1 | Y-2 | Y-3 | Y-4 | Y-5 | Y-6 | Y-7 | Y-8 | Y-9 | Y-10 | Y-11 | Y-12 | Y-13 | Y-14 | Y-15 | Y-16 | Y-17 | Y-18 | Y-19 | Y-20 | Y-21 | Y-22 | Y-23 | Y-24 | Y-25 | Y-26 | Y-27 | Y-28 | Y-29 | Y-30 | Y-31 | Y-32 | Y-33 | Y-34 | Y-35 | Y-36 | Y-37 | Y-38 | Y-39 | Y-40 | Y-41 | Y-42 | Y-43 | Y-44 | Y-45 | Y-46 | Y-47 | Y-48 | Y-49 | Y-50 | Y-51 | Y-52 | Y-53 | Y-54 | Y-55 | Y-56 | Y-57 | Y-58 | Y-59 | Y-60 | Y-61 | Y-62 | Y-63 | Y-64 | Y-65 | Y-66 | Y-67 | Y-68 | Y-69 | Y-70 | Y-71 | Y-72 | Y-73 | Y-74 | Y-75 | Y-76 | Y-77 | Y-78 | Y-79 | Y-80 | Y-81 | Y-82 | Y-83 | Y-84 | Y-85 | Y-86 | Y-87 | Y-88 | Y-89 | Y-90 | Y-91 | Y-92 | Y-93 | Y-94 | Y-95 | Y-96 | Y-97 | Y-98 | Y-99 | Y-100 | Y-101 | Y-102 | Y-103 | Y-104 | Y-105 | Y-106 | Y-107 | Y-108 | Y-109 | Y-110 | Y-111 | Y-112 | Y-113 | Y-114 | Y-115 | Y-116 | Y-117 | Y-118 | Y-119 | Y-120 | Y-121 | Y-122 | Y-123 | Y-124 | Y-125 | Y-126 | Y-127 | Y-128 | Y-129 | Y-130 | Y-131 | Y-132 | Y-133 | Y-134 | Y-135 | Y-136 | Y-137 | Y-138 | Y-139 | Y-140 | Y-141 | Y-142 | Y-143 | Y-144 | Y-145 | Y-146 | Y-147 | Y-148 | Y-149 | Y-150 | Y-151 | Y-152 | Y-153 | Y-154 | Y-155 | Y-156 | Y-157 | Y-158 | Y-159 | Y-160 | Y-161 | Y-162 | Y-163 | Y-164 | Y-165 | Y-166 | Y-167 | Y-168 | Y-169 | Y-170 | Y-171 | Y-172 | Y-173 | Y-174 | Y-175 | Y-176 | Y-177 | Y-178 | Y-179 | Y-180 | Y-181 | Y-182 | Y-183 | Y-184 | Y-185 | Y-186 | Y-187 | Y-188 | Y-189 | Y-190 | Y-191 | Y-192 | Y-193 | Y-194 | Y-195 | Y-196 | Y-197 | Y-198 | Y-199 | Y-200 | Y-201 | Y-202 | Y-203 | Y-204 | Y-205 | Y-206 | Y-207 | Y-208 | Y-209 | Y-210 | Y-211 | Y-212 | Y-213 | Y-214 | Y-215 | Y-216 | Y-217 | Y-218 | Y-219 | Y-220 | Y-221 | Y-222 | Y-223 | Y-224 | Y-225 | Y-226 | Y-227 | Y-228 | Y-229 | Y-230 | Y-231 | Y-232 | Y-233 | Y-234 | Y-235 | Y-236 | Y-237 | Y-238 | Y-239 | Y-240 | Y-241 | Y-242 | Y-243 | Y-244 | Y-245 | Y-246 | Y-247 | Y-248 | Y-249 | Y-250 | Y-251 | Y-252 | Y-253 | Y-254 | Y-255 | Y-256 | Y-257 | Y-258 | Y-259 | Y-260 | Y-261 | Y-262 | Y-263 | Y-264 | Y-265 | Y-266 | Y-267 | Y-268 | Y-269 | Y-270 | Y-271 | Y-272 | Y-273 | Y-274 | Y-275 | Y-276 | Y-277 | Y-278 | Y-279 | Y-280 | Y-281 | Y-282 | Y-283 | Y-284 | Y-285 | Y-286 | Y-287 | Y-288 | Y-289 | Y-290 | Y-291 | Y-292 | Y-293 | Y-294 | Y-295 | Y-296 | Y-297 | Y-298 | Y-299 | Y-300 | Y-301 | Y-302 | Y-303 | Y-304 | Y-305 | Y-306 | Y-307 | Y-308 | Y-309 | Y-310 | Y-311 | Y-312 | Y-313 | Y-314 | Y-315 | Y-316 | Y-317 | Y-318 | Y-319 | Y-320 | Y-321 | Y-322 | Y-323 | Y-324 | Y-325 | Y-326 | Y-327 | Y-328 | Y-329 | Y-330 | Y-331 | Y-332 | Y-333 | Y-334 | Y-335 | Y-336 | Y-337 | Y-338 | Y-339 | Y-340 | Y-341 | Y-342 | Y-343 | Y-344 | Y-345 | Y-346 | Y-347 | Y-348 | Y-349 | Y-350 | Y-351 | Y-352 | Y-353 | Y-354 | Y-355 | Y-356 | Y-357 | Y-358 | Y-359 | Y-360 | Y-361 | Y-362 | Y-363 | Y-364 | Y-365 | Y-366 | Y-367 | Y-368 | Y-369 | Y-370 | Y-371 | Y-372 | Y-373 | Y-374 | Y-375 | Y-376 | Y-377 | Y-378 | Y-379 | Y-380 | Y-381 | Y-382 | Y-383 | Y-384 | Y-385 | Y-386 | Y-387 | Y-388 | Y-389 | Y-390 | Y-391 | Y-392 | Y-393 | Y-394 | Y-395 | Y-396 | Y-397 | Y-398 | Y-399 | Y-400 | Y-401 | Y-402 | Y-403 | Y-404 | Y-405 | Y-406 | Y-407 | Y-408 | Y-409 | Y-410 | Y-411 | Y-412 | Y-413 | Y-414 | Y-415 | Y-416 | Y-417 | Y-418 | Y-419 | Y-420 | Y-421 | Y-422 | Y-423 | Y-424 | Y-425 | Y-426 | Y-427 | Y-428 | Y-429 | Y-430 | Y-431 | Y-432 | Y-433 | Y-434 | Y-435 | Y-436 | Y-437 | Y-438 | Y-439 | Y-440 | Y-441 | Y-442 | Y-443 | Y-444 | Y-445 | Y-446 | Y-447 | Y-448 | Y-449 | Y-450 | Y-451 | Y-452 | Y-453 | Y-454 | Y-455 | Y-456 | Y-457 | Y-458 | Y-459 | Y-460 | Y-461 | Y-462 | Y-463 | Y-464 | Y-465 | Y-466 | Y-467 | Y-468 | Y-469 | Y-470 | Y-471 | Y-472 | Y-473 | Y-474 | Y-475 | Y-476 | Y-477 | Y-478 | Y-479 | Y-480 | Y-481 | Y-482 | Y-483 | Y-484 | Y-485 | Y-486 | Y-487 | Y-488 | Y-489 | Y-490 | Y-491 | Y-492 | Y-493 | Y-494 | Y-495 | Y-496 | Y-497 | Y-498 | Y-499 | Y-500 | Y-501 | Y-502 | Y-503 | Y-504 | Y-505 | Y-506 | Y-507 | Y-508 | Y-509 | Y-510 | Y-511 | Y-512 | Y-513 | Y-514 | Y-515 | Y-516 | Y-517 | Y-518 | Y-519 | Y-520 | Y-521 | Y-522 | Y-523 | Y-524 | Y-525 | Y-526 | Y-527 | Y-528 | Y-529 | Y-530 | Y-531 | Y-532 | Y-533 | Y-534 | Y-535 | Y-536 | Y-537 | Y-538 | Y-539 | Y-540 | Y-541 | Y-542 | Y-543 | Y-544 | Y-545 | Y-546 | Y-547 | Y-548 | Y-549 | Y-550 | Y-551 | Y-552 | Y-553 | Y-554 | Y-555 | Y-556 | Y-557 | Y-558 | Y-559 | Y-560 | Y-561 | Y-562 | Y-563 | Y-564 | Y-565 | Y-566 | Y-567 | Y-568 | Y-569 | Y-570 | Y-571 | Y-572 | Y-573 | Y-574 | Y-575 | Y-576 | Y-577 | Y-578 | Y-579 | Y-580 | Y-581 | Y-582 | Y-583 | Y-584 | Y-585 | Y-586 | Y-587 | Y-588 | Y-589 | Y-590 | Y-591 | Y-592 | Y-593 | Y-594 | Y-595 | Y-596 | Y-597 | Y-598 | Y-599 | Y-600 | Y-601 | Y-602 | Y-603 | Y-604 | Y-605 | Y-606 | Y-607 | Y-608 | Y-609 | Y-610 | Y-611 | Y-612 | Y-613 | Y-614 | Y-615 | Y-616 | Y-617 | Y-618 | Y-619 | Y-620 | Y-621 | Y-622 | Y-623 | Y-624 | Y-625 | Y-626 | Y-627 | Y-628 | Y-629 | Y-630 | Y-631 | Y-632 | Y-633 | Y-634 | Y-635 | Y-636 | Y-637 | Y-638 | Y-639 | Y-640 | Y-641 | Y-642 | Y-643 | Y-644 | Y-645 | Y-646 | Y-647 | Y-648 | Y-649 | Y-650 | Y-651 | Y-652 | Y-653 | Y-654 | Y-655 | Y-656 | Y-657 | Y-658 | Y-659 | Y-660 | Y-661 | Y-662 | Y-663 | Y-664 | Y-665 | Y-666 | Y-667 | Y-668 | Y-669 | Y-670 | Y-671 | Y-672 | Y-673 | Y-674 | Y-675 | Y-676 | Y-677 | Y-678 | Y-679 | Y-680 | Y-681 | Y-682 | Y-683 | Y-684 | Y-685 | Y-686 | Y-687 | Y-688 | Y-689 | Y-690 | Y-691 | Y-692 | Y-693 | Y-694 | Y-695 | Y-696 | Y-697 | Y-698 | Y-699 | Y-700 | Y-701 | Y-702 | Y-703 | Y-704 | Y-705 | Y-706 | Y-707 | Y-708 | Y-709 | Y-710 | Y-711 | Y-712 | Y-713 | Y-714 | Y-715 | Y-716 | Y-717 | Y-718 | Y-719 | Y-720 | Y-721 | Y-722 | Y-723 | Y-724 | Y-725 | Y-726 | Y-727 | Y-728 | Y-729 | Y-730 | Y-731 | Y-732 | Y-733 | Y-734 | Y-735 | Y-736 | Y-737 | Y-738 | Y-739 | Y-740 | Y-741 | Y-742 | Y-743 | Y-744 | Y-745 | Y-746 | Y-747 | Y-748 | Y-749 | Y-750 | Y-751 | Y-752 | Y-753 | Y-754 | Y-755 | Y-756 | Y-757 | Y-758 | Y-759 | Y-760 | Y-761 | Y-762 | Y-763 | Y-764 | Y-765 | Y-766 | Y-767 | Y-768 | Y-769 | Y-770 | Y-771 | Y-772 | Y-773 | Y-774 | Y-775 | Y-776 | Y-777 | Y-778 | Y-779 | Y-780 | Y-781 | Y-782 | Y-783 | Y-784 | Y-785 | Y-786 | Y-787 | Y-788 | Y-789 | Y-790 | Y-791 | Y-792 | Y-793 | Y-794 | Y-795 | Y-796 | Y-797 | Y-798 | Y-799 | Y-800 | Y-801 | Y-802 | Y-803 | Y-804 | Y-805 | Y-806 | Y-807 | Y-808 | Y-809 | Y-810 | Y-811 | Y-812 | Y-813 | Y-814 | Y-815 | Y-816 | Y-817 | Y-818 | Y-819 | Y-820 | Y-821 | Y-822 | Y-823 | Y-824 | Y-825 | Y-826 | Y-827 | Y-828 | Y-829 | Y-830 | Y-831 | Y-832 | Y-833 | Y-834 | Y-835 | Y-836 | Y-837 | Y-838 | Y-839 | Y-840 | Y-841 | Y-842 | Y-843 | Y-844 | Y-845 | Y-846 | Y-847 | Y-848 | Y-849 | Y-850 | Y-851 | Y-852 | Y-853 | Y-854 | Y-855 | Y-856 | Y-857 | Y-858 | Y-859 | Y-860 | Y-861 | Y-862 | Y-863 | Y-864 | Y-865 | Y-866 | Y-867 | Y-868 | Y-869 | Y-870 | Y-871 | Y-872 | Y-873 | Y-874 | Y-875 | Y-876 | Y-877 | Y-878 | Y-879 | Y-880 | Y-881 | Y-882 | Y-883 | Y-884 | Y-885 | Y-886 | Y-887 | Y-888 | Y-889 | Y-890 | Y-891 | Y-892 | Y-893 | Y-894 | Y-895 | Y-896 | Y-897 | Y-898 | Y-899 | Y-900 | Y-901 | Y-902 | Y-903 | Y-904 | Y-905 | Y-906 | Y-907 | Y-908 | Y-909 | Y-910 | Y-911 | Y-912 | Y-913 | Y-914 | Y-915 | Y-916 | Y-917 | Y-918 | Y-919 | Y-920 | Y-921 | Y-922 | Y-923 | Y-924 | Y-925 | Y-926 | Y-927 | Y-928 | Y-929 | Y-930 | Y-931 | Y-932 | Y-933 | Y-934 | Y-935 | Y-936 | Y-937 | Y-938 | Y-939 | Y-940 | Y-941 | Y-942 | Y-943 | Y-944 | Y-945 | Y-946 | Y-947 | Y-948 | Y-949 | Y-950 | Y-951 | Y-952 | Y-953 | Y-954 | Y-955 | Y-956 | Y-957 | Y-958 | Y-959 | Y-960 | Y-961 | Y-962 | Y-963 | Y-964 | Y-965 | Y-966 | Y-967 | Y-968 | Y-969 | Y-970 | Y-971 | Y-972 | Y-973 | Y-974 | Y-975 | Y-976 | Y-977 | Y-978 | Y-979 | Y-980 | Y-981 | Y-982 | Y-983 | Y-984 | Y-985 | Y-986 | Y-987 | Y-988 | Y-989 | Y-990 | Y-991 | Y-992 | Y-993 | Y-994 | Y-995 | Y-996 | Y-997 | Y-998 | Y-999 | Y-1000 | Y-1001 | Y-1002 | Y-1003 | Y-1004 | Y-1005 | Y-1006 | Y-1007 | Y-1008 | Y-1009 | Y-1010 | Y-1011 | Y-1012 | Y-1013 | Y-1014 | Y-1015 | Y-1016 | Y-1017 | Y-1018 | Y-1019 | Y-1020 | Y-1021 | Y-1022 | Y-1023 | Y-1024 | Y-1025 | Y-1026 | Y-1027 | Y-1028 | Y-1029 | Y-1030 | Y-1031 | Y-1032 | Y-1033 | Y-1034 | Y-1035 | Y-1036 | Y-1037 | Y-1038 | Y-1039 | Y-1040 | Y-1041 | Y-1042 | Y-1043 | Y-1044 | Y-1045 | Y-1046 | Y-1047 | Y-1048 | Y-1049 | Y-1050 | Y-1051 | Y-1052 | Y-1053 | Y-1054 | Y-1055 | Y-1056 | Y-1057 | Y-1058 | Y-1059 | Y-1060 | Y-1061 | Y-1062 | Y-1063 | Y-1064 | Y-1065 | Y-1066 | Y-1067 | Y-1068 | Y-1069 | Y-1070 | Y-1071 | Y-1072 | Y-1073 | Y-1074 | Y-1075 | Y-1076 | Y-1077 | Y-1078 | Y-1079 | Y-1080 | Y-1081 | Y-1082 | Y-1083 | Y-1084 | Y-1085 | Y-1086 | Y-1087 | Y-1088 | Y-1089 | Y-1090 | Y-1091 | Y-1092 | Y-1093 | Y-1094 | Y-1095 | Y-1096 | Y-1097 | Y-1098 | Y-1099 | Y-1100 | Y-1101 | Y-1102 | Y-1103 | Y-1104 | Y-1105 | Y-1106 | Y-1107 | Y-1108 | Y-1109 | Y-1110 | Y-1111 | Y-1112 | Y-1113 | Y-1114 | Y-1115 | Y-1116 | Y-1117 | Y-1118 | Y-1119 | Y-1120 | Y-1121 | Y-1122 | Y-1123 | Y-1124 | Y-1125 | Y-1126 | Y-1127 | Y-1128 | Y-1129 | Y-1130 | Y-1131 | Y-1132 | Y-1133 | Y-1134 | Y-1135 | Y-1136 | Y-1137 | Y-1138 | Y-1139 | Y-1140 | Y-1141 | Y-1142 | Y-1143 | Y-1144 | Y-1145 | Y-1146 | Y-1147 | Y-1148 | Y-1149 | Y-1150 | Y-1151 | Y-1152 | Y-1153 | Y-1154 | Y-1155 | Y-1156 | Y-1157 | Y-1158 | Y-1159 | Y-1160 | Y-1161 | Y-1162 | Y-1163 | Y-1164 | Y-1165 | Y-1166 | Y-1167 | Y-1168 | Y-1169 | Y-1170 | Y-1171 | Y-1172 | Y-1173 | Y-1174 | Y-1175 | Y-1176 | Y-1177 | Y-1178 | Y-1179 | Y-1180 | Y-1181 | Y-1182 | Y-1183 | Y-1184 | Y-1185 | Y-1186 | Y-1187 | Y-1188 | Y-1189 | Y-1190 | Y-1191 | Y-1192 | Y-1193 | Y-1194 | Y-1195 | Y-1196 | Y-1197 | Y-1198 | Y-1199 | Y-1200 | Y-1201 | Y-1202 | Y-1203 | Y-1204</ |
|-------|----------|----------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----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|-------|----------|----------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----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TABLE 9.3

BLADE-ELEMENT AND OVERALL PERFORMANCE WITH UNIFORM INLET 100 PERCENT OF DESIGN SPEED

Rotor

| | DIA-1 | DIA-2 | V-1 | V-2 | VM-1 | VM-2 | VO-1 | VO-2 | B-1 | B-2 | B-1-1 | B-1-2 | Y-1-1 | Y-1-2 | VO-1-1 | VO-1-2 | U-1 | U-2 |
|----|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|--------|--------|--------|
| IN | IN | IN | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | DEGREE | DEGREE | DEGREE | DEGREE | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC |
| 5 | 17.467 | 19.769 | 573.9 | 972.7 | 573.9 | 615.3 | .0 | 753.3 | .00 | 50.76 | 55.82 | 18.27 | 1021.5 | 647.9 | -845.1 | -203.1 | 845.1 | 956.5 |
| 10 | 18.467 | 20.408 | 588.4 | 936.7 | 588.4 | 609.4 | .0 | 711.3 | .00 | 47.41 | 56.63 | 24.36 | 1069.8 | 669.2 | -893.5 | -276.1 | 893.5 | 987.4 |
| 15 | 19.467 | 21.047 | 601.9 | 905.0 | 601.9 | 602.3 | .0 | 675.5 | .00 | 48.28 | 57.42 | 29.63 | 1117.8 | 693.4 | -941.8 | -342.8 | 941.8 | 1018.3 |
| 30 | 22.314 | 22.964 | 630.3 | 828.0 | 630.3 | 546.5 | .0 | 620.4 | .00 | 48.52 | 59.72 | 41.79 | 1250.1 | 736.1 | -1079.6 | -490.7 | 1079.6 | 1111.0 |
| 50 | 25.791 | 25.520 | 645.3 | 803.6 | 645.3 | 546.0 | .0 | 587.7 | .00 | 47.20 | 62.65 | 47.75 | 1404.8 | 845.1 | -1247.6 | -645.0 | 1247.6 | 1234.7 |
| 70 | 28.954 | 28.076 | 639.2 | 771.3 | 639.2 | 536.7 | .0 | 554.0 | .00 | 45.91 | 65.47 | 56.28 | 1539.8 | 967.0 | -1400.8 | -804.4 | 1400.8 | 1358.4 |
| 85 | 31.295 | 29.993 | 619.0 | 798.3 | 619.0 | 526.9 | .0 | 599.7 | .00 | 48.69 | 67.76 | 58.25 | 1635.8 | 1091.3 | -1514.1 | -851.4 | 1514.1 | 1451.1 |
| 90 | 31.683 | 30.630 | 612.0 | 797.2 | 612.0 | 485.6 | .0 | 631.9 | .00 | 52.45 | 68.35 | 60.26 | 1659.7 | 1099.1 | -1542.6 | -850.0 | 1542.6 | 1461.9 |
| 95 | 32.499 | 31.271 | 606.0 | 765.3 | 606.0 | 448.1 | .0 | 620.4 | .00 | 54.16 | 68.92 | 63.34 | 1685.1 | 998.7 | -1572.4 | -892.5 | 1572.4 | 1512.9 |

%SPAN

| | INCS | INCH | DEV | TURN | CAMBER | OMEGA-B | D-FAC | OMEGA-B | LOSS-P | PO2/ | EFF-P | EFF-AD | EFF-P | M-1 | M-2 | M-1-1 | M-2-2 |
|----|--------|--------|--------|--------|--------|---------|-------|---------|--------|-------|--------|--------|--------|-------|-------|-------|--------|
| 5 | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | SHOCK | | | LOSS-P | PO1 | TOTAL | TOTAL | STATIC | | | | |
| 10 | .91 | 6.84 | 16.40 | 37.55 | 47.12 | .0140 | .5377 | .0380 | .0079 | .0050 | 2.0379 | .9775 | .9751 | .9653 | .5288 | .8386 | .9424 |
| 15 | .61 | 7.01 | 14.71 | 32.27 | 39.97 | .0170 | .5350 | .0322 | .0067 | .0032 | 2.0069 | .9789 | .9767 | .9698 | .5440 | .8057 | .9921 |
| 30 | .85 | 6.77 | 13.11 | 27.79 | 34.02 | .0211 | .5306 | .0298 | .0062 | .0018 | 1.9802 | .9783 | .9761 | .9709 | .5573 | .7768 | 1.0390 |
| 50 | 1.78 | 5.80 | 12.06 | 17.93 | 24.19 | .0430 | .5468 | .0866 | .0174 | .0087 | 1.9137 | .9277 | .9209 | .9159 | .5840 | .7037 | 1.1619 |
| 70 | 3.01 | 5.69 | 7.39 | 12.90 | 14.59 | .0786 | .5259 | .1085 | .0214 | .0059 | 1.9329 | .0865 | .8863 | .8865 | .5981 | .6773 | 1.2999 |
| 85 | 3.96 | 5.82 | 5.69 | 9.20 | 9.06 | .1110 | .4919 | .1232 | .0232 | .0024 | 1.9315 | .8693 | .8566 | .8614 | .5925 | .6456 | 1.4214 |
| 90 | 4.37 | 5.65 | 4.06 | 9.51 | 7.94 | .1333 | .5180 | .1944 | .0371 | .0120 | 1.9925 | .7996 | .7791 | .7819 | .5745 | .6594 | 1.5038 |
| 95 | 4.49 | 5.59 | 5.10 | 8.09 | 7.60 | .1406 | .5478 | .2499 | .0458 | .0304 | 1.9955 | .7511 | .7257 | .7310 | .5668 | .6527 | 1.5288 |
| | 4.69 | 5.61 | 7.44 | 5.58 | 7.41 | .1511 | .5429 | .2444 | .0446 | .0194 | 1.9637 | .7322 | .7056 | .7168 | .5601 | .6243 | 1.5555 |

TO/TO PO/PO EFF-AD EFF-P

INLET INLET INLET INLET
1.2439 1.9540 86.38 87.62

STA-1 STA-2

---LOCAL---
8.0 9.0

Stator

| | DIA-1 | DIA-2 | V-1 | V-2 | VM-1 | VM-2 | VO-1 | VO-2 | B-1 | B-2 | B-1-1 | B-1-2 | Y-1-1 | Y-1-2 | VO-1-1 | VO-1-2 | U-1 | U-2 |
|----|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|--------|--------|
| IN | IN | IN | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | DEGREE | DEGREE | DEGREE | DEGREE | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC |
| 5 | 20.409 | 21.489 | 1017.4 | 710.0 | 709.0 | 710.0 | 729.7 | 4.2 | 45.83 | .34 | 19.97 | 55.56 | 754.4 | 1258.5 | -257.7 | -1035.5 | 987.4 | 1039.7 |
| 10 | 21.008 | 21.961 | 983.2 | 678.8 | 699.5 | 678.5 | 670.9 | -18.4 | 44.64 | -1.57 | 24.95 | 57.88 | 771.7 | 1276.4 | -325.6 | -1080.9 | 1016.4 | 1052.5 |
| 15 | 21.589 | 22.432 | 953.3 | 654.4 | 689.3 | 653.9 | 658.5 | -24.6 | 43.69 | -2.15 | 29.24 | 59.49 | 790.4 | 1288.3 | -386.0 | -1103.9 | 1044.5 | 1085.3 |
| 30 | 23.314 | 23.902 | 885.1 | 647.1 | 640.0 | 647.0 | 611.4 | .0 | 43.69 | .62 | 38.89 | 60.62 | 822.6 | 1319.1 | -516.6 | -1199.5 | 1128.0 | 1156.4 |
| 50 | 25.601 | 25.893 | 872.1 | 657.6 | 643.9 | 657.5 | 588.2 | 13.8 | 42.41 | 1.20 | 45.28 | 62.05 | 915.3 | 1402.6 | -650.4 | -1239.9 | 1238.0 | 1252.8 |
| 70 | 27.818 | 27.902 | 861.3 | 643.5 | 654.7 | 643.3 | 559.7 | -16.9 | 40.53 | -1.50 | 50.21 | 64.79 | 1023.1 | 1510.7 | -786.2 | -1366.9 | 1345.9 | 1379.9 |
| 85 | 29.408 | 29.382 | 911.2 | 655.0 | 672.1 | 653.7 | 615.3 | 40.0 | 42.47 | 3.50 | 50.23 | 64.68 | 1050.6 | 1528.4 | -807.5 | -1381.6 | 1422.6 | 1471.6 |
| 90 | 29.914 | 29.856 | 919.1 | 664.9 | 648.7 | 660.1 | 651.1 | 74.6 | 45.11 | 6.45 | 50.83 | 64.27 | 1027.0 | 1520.6 | -796.2 | -1366.8 | 1447.3 | 1474.5 |
| 95 | 30.382 | 30.293 | 898.9 | 642.1 | 632.8 | 636.3 | 638.5 | 85.8 | 45.26 | 7.68 | 52.73 | 65.24 | 1044.9 | 1519.5 | -831.4 | -1379.8 | 1469.9 | 1465.6 |

%SPAN

| | INCS | INCH | DEV | TURN | CAMBER | OMEGA-B | D-FAC | OMEGA-B | LOSS-P | PO2/ | EFF-P | EFF-AD | EFF-P | M-1 | M-2 | M-1-1 | M-2-2 |
|----|--------|--------|--------|--------|--------|---------|-------|---------|--------|-------|-------|--------|--------|-------|-------|-------|-------|
| 5 | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | SHOCK | | | LOSS-P | PO1 | TOTAL | TOTAL | STATIC | | | | |
| 10 | -76 | 2.56 | 12.75 | 45.49 | 55.90 | .0030 | .4749 | .1609 | .0400 | .0393 | .9360 | .0000 | .0000 | .7558 | .8738 | .5933 | .6548 |
| 15 | -76 | 2.18 | 9.88 | 46.21 | 53.88 | .0031 | .4898 | .1671 | .0426 | .0418 | .9370 | .0000 | .0000 | .7529 | .8453 | .5671 | .6717 |
| 30 | -66 | 2.28 | 8.70 | 45.84 | 52.34 | .0035 | .4976 | .1678 | .0438 | .0499 | .9397 | .0000 | .0000 | .7421 | .8209 | .5463 | .6835 |
| 50 | 1.24 | 4.23 | 11.83 | 43.07 | 50.67 | .0084 | .4582 | .0641 | .0185 | .0152 | .9791 | .0000 | .0000 | .8840 | .7578 | .5397 | .7029 |
| 70 | 1.74 | 4.88 | 13.21 | 41.21 | 49.55 | .0137 | .4465 | .0649 | .0147 | .0105 | .9854 | .0000 | .0000 | .9060 | .7417 | .5461 | .7751 |
| 85 | .93 | 4.16 | 11.94 | 42.04 | 49.84 | .0118 | .4745 | .0599 | .0198 | .0159 | .9822 | .0000 | .0000 | .8891 | .7284 | .5320 | .8627 |
| 90 | 2.94 | 6.25 | 19.40 | 36.98 | 51.99 | .0208 | .5020 | .1398 | .0468 | .0415 | .9554 | .0000 | .0000 | .7798 | .7608 | .5336 | .8791 |
| 95 | 5.60 | 8.66 | 23.33 | 37.57 | 53.61 | .0248 | .5093 | .1222 | .0437 | .0346 | .9585 | .0000 | .0000 | .7998 | .7627 | .5372 | .8547 |

NCORR WCORR TO/TO PO/PO EFF-AD EFF-P WCI/A1

INLET INLET INLET INLET INLET INLET LBM/SEC
RPM LBM/SEC
11088. 177.97 1.2439 1.8919 81.84 83.39 39.95

STA-1 STA-2

---LOCAL---
10.0 11.0

TABLE 9.4

BLADE-ELEMENT AND OVERALL PERFORMANCE WITH UNIFORM INLET 100 PERCENT OF DESIGN SPEED

134

Rotor

| %SPAN | DIA-1 IN | DIA-2 IN | V-1 FT/SEC | V-2 FT/SEC | V-1-1 FT/SEC | V-1-2 FT/SEC | R-1 DEGREE | H-2 DEGREE | B-1-1 DEGREE | B-1-2 DEGREE | V-1-1 FT/SEC | V-1-2 FT/SEC | V-1-1 FT/SEC | V-1-2 FT/SEC | U-1 FT/SEC | U-2 FT/SEC |
|-------|----------------|----------------|---------------|----------------|------------------|------------------|------------------|-----------------|-------------------|-----------------|-----------------|-----------------|-----------------|-----------------|---------------|---------------|
| 5 | 17.467 | 19.769 | 572.2 | 965.5 | 572.2 | 596.5 | .00 | 51.84 | 55.90 | 18.32 | 1020.8 | 628.4 | -895.4 | -197.6 | 845.4 | 956.8 |
| 10 | 18.467 | 20.498 | 586.7 | 931.9 | 586.7 | 597.0 | .00 | 50.16 | 56.72 | 24.49 | 1059.1 | 656.2 | -893.7 | -272.1 | 893.7 | 987.7 |
| 15 | 19.467 | 21.047 | 600.1 | 904.2 | 600.1 | 593.8 | .00 | 48.95 | 57.50 | 29.54 | 1117.1 | 682.9 | -942.1 | -336.7 | 942.1 | 1018.6 |
| 30 | 22.514 | 22.964 | 628.2 | 824.0 | 628.2 | 531.2 | .00 | 49.86 | 59.81 | 42.17 | 1249.3 | 717.0 | -1079.9 | -481.4 | 1079.9 | 1111.4 |
| 50 | 25.791 | 25.520 | 643.1 | 800.6 | 643.1 | 528.6 | .00 | 48.68 | 62.74 | 50.16 | 1404.2 | 825.3 | -1248.2 | -633.8 | 1248.2 | 1235.1 |
| 70 | 28.954 | 28.076 | 638.9 | 771.5 | 638.9 | 521.1 | .00 | 47.51 | 65.49 | 56.57 | 1540.1 | 946.5 | -1401.3 | -789.9 | 1401.3 | 1358.8 |
| 85 | 31.295 | 29.993 | 620.2 | 807.8 | 620.2 | 530.7 | .00 | 48.93 | 67.73 | 57.79 | 1636.7 | 995.8 | -1514.6 | -842.5 | 1514.6 | 1451.6 |
| 90 | 31.883 | 30.630 | 613.4 | 806.5 | 613.4 | 501.7 | .00 | 51.33 | 68.32 | 59.49 | 1680.5 | 988.0 | -1543.0 | -851.1 | 1543.0 | 1482.4 |
| 95 | 32.499 | 31.271 | 606.6 | 776.1 | 606.6 | 446.5 | .00 | 54.89 | 68.91 | 63.06 | 1685.5 | 985.6 | -1572.9 | -878.6 | 1572.9 | 1513.4 |
| %SPAN | INCS DEGREE | INCM DEGREE | DEV DEGREE | TUIN DEGREE | CAMBER DEGREE | OMEGA-R SHOCK | D-FAC OMEGA-R | LOSS-P TOTAL | LOSS-P PROFILE | P02/ P01 | EFF-P TOTAL | EFF-P STATIC | M-1 | M-2 | M-1-1 | M-1-2 |
| 5 | .49 | 6.92 | 16.45 | 37.58 | 47.12 | .0143 | .5579 | .0244 | .0051 | .0021 | 2.0599 | .9852 | .9355 | .9778 | .5270 | .8309 |
| 10 | .69 | 7.10 | 14.84 | 32.23 | 39.96 | .0175 | .5479 | .0096 | .0020 | .0016 | 2.0348 | .9926 | .9918 | .9900 | .5421 | .8005 |
| 15 | .93 | 6.87 | 13.02 | 27.96 | 34.02 | .0214 | .5410 | .0048 | .0010 | .0035 | 2.0156 | .9949 | .9943 | .9936 | .5554 | .7753 |
| 30 | 1.86 | 5.89 | 12.43 | 17.65 | 24.18 | .0433 | .5639 | .0766 | .0153 | .0066 | 1.9443 | .9359 | .9307 | .9271 | .5817 | .6949 |
| 50 | 3.07 | 5.78 | 7.81 | 12.58 | 14.60 | .0789 | .5422 | .1012 | .0198 | .0044 | 1.9687 | .9051 | .8955 | .8965 | .5958 | .6731 |
| 70 | 3.97 | 5.85 | 5.97 | 8.92 | 9.04 | .1112 | .5086 | .1172 | .0219 | .0013 | 1.9768 | .8785 | .8662 | .8715 | .5923 | .6439 |
| 85 | 4.33 | 5.63 | 3.57 | 9.94 | 7.91 | .1335 | .5237 | .1714 | .0331 | .0077 | 2.0602 | .8277 | .8081 | .8104 | .5763 | .6667 |
| 90 | 4.46 | 5.57 | 4.32 | 8.83 | 7.59 | .1407 | .5426 | .2138 | .0401 | .0142 | 2.0665 | .7895 | .7669 | .7708 | .5683 | .6610 |
| 95 | 4.68 | 5.60 | 7.16 | 5.85 | 7.40 | .1913 | .5541 | .2489 | .0424 | .0170 | 2.0331 | .7543 | .7286 | .7388 | .5608 | .6320 |

TO/TO P0/P0 EFF-AD EFF-P
INLET INLET INLET INLET
1.2485 1.9977 87.84 88.97

STA-1 STA-2
---LOCAL---

8.0 9.0

Stator

| %SPAN | DIA-1 IN | DIA-2 IN | V-1 FT/SEC | V-2 FT/SEC | V-1-1 FT/SEC | V-1-2 FT/SEC | R-1 DEGREE | H-2 DEGREE | B-1-1 DEGREE | B-1-2 DEGREE | V-1-1 FT/SEC | V-1-2 FT/SEC | V-1-1 FT/SEC | V-1-2 FT/SEC | U-1 FT/SEC | U-2 FT/SEC |
|-------|----------------|----------------|---------------|----------------|------------------|------------------|------------------|-----------------|-------------------|-----------------|-----------------|-----------------|-----------------|-----------------|---------------|---------------|
| 5 | 20.409 | 21.489 | 1006.3 | 679.0 | 687.0 | 679.0 | .00 | 46.95 | .00 | 20.17 | 50.36 | 731.9 | 1242.0 | -252.3 | -1040.0 | 937.7 |
| 10 | 21.000 | 21.961 | 974.3 | 652.1 | 682.8 | 652.1 | .00 | 45.50 | .00 | 25.22 | 58.47 | 754.9 | 1247.1 | -321.7 | -1062.8 | 1016.7 |
| 15 | 21.589 | 22.432 | 948.2 | 630.5 | 676.1 | 630.5 | .00 | 44.52 | .00 | 29.34 | 59.05 | 775.9 | 1255.5 | -380.0 | -1085.6 | 1044.8 |
| 30 | 23.314 | 23.902 | 877.2 | 621.5 | 619.5 | 621.5 | .00 | 45.07 | .00 | 39.30 | 61.75 | 800.9 | 1313.2 | -507.3 | -1156.8 | 1128.3 |
| 50 | 25.601 | 25.893 | 846.0 | 634.4 | 624.3 | 634.4 | .00 | 43.87 | .00 | 45.66 | 63.15 | 893.2 | 1404.6 | -638.8 | -1253.1 | 1239.0 |
| 70 | 27.818 | 27.902 | 858.6 | 632.3 | 637.4 | 632.3 | .00 | 42.06 | .00 | 50.42 | 64.91 | 1000.5 | 1491.1 | -771.1 | -1350.4 | 1346.3 |
| 85 | 29.408 | 29.382 | 917.5 | 656.0 | 671.3 | 656.0 | .00 | 42.97 | .00 | 49.92 | 65.23 | 1042.7 | 1566.0 | -797.8 | -1422.0 | 1423.3 |
| 90 | 29.914 | 29.856 | 924.9 | 664.6 | 657.2 | 664.6 | .00 | 44.72 | .00 | 50.49 | 65.30 | 1033.0 | 1590.5 | -797.0 | -1444.9 | 1447.8 |
| 95 | 30.382 | 30.293 | 906.7 | 646.2 | 628.4 | 646.2 | .00 | 46.13 | .00 | 52.43 | 66.21 | 1030.6 | 1602.2 | -816.8 | -1466.1 | 1470.4 |
| %SPAN | INCS DEGREE | INCM DEGREE | DEV DEGREE | TUIN DEGREE | CAMBER DEGREE | OMEGA-R SHOCK | D-FAC OMEGA-R | LOSS-P TOTAL | LOSS-P PROFILE | P02/ P01 | EFF-P TOTAL | EFF-P STATIC | M-1 | M-2 | M-1-1 | M-1-2 |
| 5 | .69 | 3.61 | 12.41 | 46.95 | 55.90 | .0043 | .5023 | .1643 | .0409 | .0398 | .9359 | .0000 | .7638 | .8620 | .5652 | .6351 |
| 10 | .10 | 3.03 | 11.48 | 45.50 | 53.89 | .0041 | .5087 | .1605 | .0433 | .0422 | .9371 | .0000 | .7585 | .8373 | .5431 | .6562 |
| 15 | .16 | 3.11 | 10.85 | 44.52 | 52.33 | .0047 | .5149 | .1741 | .0455 | .0443 | .9381 | .0000 | .7442 | .8157 | .5247 | .6694 |
| 30 | 3.60 | 5.59 | 11.21 | 45.07 | 50.68 | .0121 | .4877 | .0717 | .0201 | .0167 | .9777 | .0000 | .8840 | .7493 | .5165 | .6917 |
| 50 | 3.20 | 6.32 | 12.02 | 43.87 | 49.58 | .0184 | .4785 | .0596 | .0183 | .0123 | .9821 | .0000 | .8905 | .7343 | .5248 | .7531 |
| 70 | 2.47 | 5.70 | 13.45 | 42.06 | 49.84 | .0175 | .4853 | .0628 | .0200 | .0150 | .9815 | .0000 | .8910 | .7235 | .5208 | .8400 |
| 85 | 3.49 | 6.80 | 15.90 | 42.97 | 51.98 | .0237 | .5234 | .1490 | .0521 | .0438 | .9520 | .0000 | .8910 | .7676 | .5336 | .8705 |
| 90 | 5.01 | 8.34 | 17.51 | 44.72 | 53.66 | .0302 | .5316 | .1415 | .0503 | .0396 | .9543 | .0000 | .7821 | .7678 | .5374 | .8596 |
| 95 | 6.41 | 9.78 | 19.69 | 46.13 | 50.01 | .0302 | .5477 | .1292 | .0466 | .0357 | .9599 | .0000 | .7835 | .7510 | .5200 | .8504 |

STA-1 STA-2
---LOCAL---

10.0 11.0

WORM WORM TO/TO P0/P0 EFF-AD EFF-P WCI/A1
INLET INLET INLET INLET INLET INLET LHM/SEC
KPM LHM/SEC % SOFT
11092. 177.84 1.2485 1.9307 85.10 84.59 39.92

TABLE 9.5

BLADE-ELEMENT AND OVERALL PERFORMANCE WITH UNIFORM INLET 100 PERCENT OF DESIGN SPEED

Rotor

| %SPAN | DIA-1 IN | DIA-2 IN | V-1 FT/SEC | V-2 FT/SEC | VH-1 FT/SEC | VH-2 FT/SEC | VO-1 FT/SEC | VO-2 FT/SEC | R-1 DEGREE | B-1 DEGREE | B*-1 DEGREE | B*-2 DEGREE | V*-1 FT/SEC | V*-2 FT/SEC | VO*-1 FT/SEC | VO*-2 FT/SEC | U-1 FT/SEC | U-2 FT/SEC |
|-------|----------------|-------------|---------------|----------------|------------------|------------------|------------------|-----------------|-------------------|---------------|----------------|----------------|------------------|----------------|-----------------|-----------------|---------------|---------------|
| 5 | 17.467 | 19.769 | 564.9 | 973.3 | 564.9 | 594.6 | .0 | 770.6 | .00 | 52.35 | 56.24 | 17.37 | 1016.6 | 623.0 | -845.2 | -186.0 | 845.2 | 956.6 |
| 10 | 18.467 | 20.408 | 579.1 | 938.1 | 579.1 | 531.4 | .0 | 728.2 | .00 | 50.91 | 57.06 | 23.67 | 1064.8 | 645.9 | -893.6 | -259.4 | 893.6 | 987.5 |
| 15 | 19.467 | 21.047 | 592.2 | 910.8 | 592.2 | 516.0 | .0 | 695.0 | .00 | 49.74 | 57.84 | 28.78 | 1112.7 | 672.0 | -942.0 | -323.4 | 942.0 | 1018.5 |
| 30 | 22.314 | 23.964 | 619.1 | 827.5 | 619.1 | 524.0 | .0 | 640.5 | .00 | 30.71 | 60.17 | 41.92 | 1244.7 | 704.5 | -1079.8 | -470.7 | 1079.8 | 1111.2 |
| 50 | 25.791 | 25.520 | 532.6 | 806.3 | 632.6 | 516.0 | .0 | 619.5 | .00 | 50.21 | 63.11 | 50.01 | 1399.3 | 803.2 | -1240.0 | -615.4 | 1240.0 | 1234.9 |
| 70 | 26.954 | 26.076 | 629.1 | 778.6 | 629.1 | 509.3 | .0 | 589.0 | .00 | 49.15 | 65.82 | 56.48 | 1535.8 | 923.0 | -1401.1 | -769.6 | 1401.1 | 1358.6 |
| 85 | 31.295 | 29.993 | 611.6 | 816.0 | 611.6 | 534.6 | .0 | 617.2 | .00 | 49.10 | 68.00 | 57.34 | 1633.4 | 990.7 | -1514.4 | -834.1 | 1514.4 | 1451.4 |
| 90 | 31.363 | 30.630 | 605.0 | 814.7 | 605.0 | 517.9 | .0 | 628.7 | .00 | 50.52 | 68.59 | 58.75 | 1657.2 | 998.3 | -1542.8 | -853.4 | 1542.8 | 1482.2 |
| 95 | 32.499 | 31.271 | 598.0 | 788.0 | 598.0 | 439.2 | .0 | 654.2 | .00 | 56.13 | 69.18 | 62.92 | 1682.5 | 964.9 | -1572.6 | -859.0 | 1572.6 | 1513.2 |
| %SPAN | INCS DEGREE | INCM IN | DEV DEGREE | TURN DEGREE | CAMBER DEGREE | OMEGA-B SHOCK | D-FAC OMEGA-B | LOSS-P TOTAL | LOSS-P PROFILE | P02/ P01 | EFF-P TOTAL | EFF-P TOTAL | EFF-AD STATIC | M-1 | M-2 | M*-1 | M*-2 | |
| 5 | 1.84 | 7.27 | 15.50 | 38.88 | 47.12 | .0150 | .5640 | .0268 | .0056 | .0025 | 2.0784 | .9841 | .9824 | .5199 | .8372 | .9369 | .5359 | |
| 10 | 1.63 | 7.44 | 14.02 | 33.39 | 39.97 | .0181 | .5586 | .0185 | .0039 | .0001 | 2.0500 | .9875 | .9861 | .5377 | .8051 | .9661 | .5543 | |
| 15 | 1.27 | 7.21 | 12.25 | 29.07 | 34.02 | .0221 | .5520 | .0140 | .0029 | .0018 | 2.0317 | .9892 | .9880 | .5476 | .7801 | 1.0329 | .5755 | |
| 30 | 2.22 | 6.25 | 12.18 | 18.26 | 24.16 | .0440 | .5746 | .0850 | .0170 | .0082 | 1.9561 | .9316 | .9247 | .9200 | .5727 | .7010 | 1.1548 | |
| 50 | 3.44 | 6.15 | 7.66 | 13.10 | 14.61 | .0795 | .5504 | .1138 | .0233 | .0078 | 1.9889 | .8920 | .8809 | .5855 | .6762 | 1.2901 | .6737 | |
| 70 | 4.29 | 6.19 | 5.88 | 9.34 | 9.04 | .1117 | .5270 | .1342 | .0251 | .0044 | 1.9986 | .8654 | .8516 | .5827 | .6479 | 1.4111 | .7680 | |
| 85 | 4.61 | 5.92 | 3.09 | 10.66 | 7.88 | .1339 | .5276 | .1660 | .0325 | .0066 | 2.0924 | .8348 | .8166 | .5683 | .6735 | 1.4962 | .8172 | |
| 90 | 4.77 | 5.84 | 3.57 | 9.84 | 7.58 | .1411 | .5349 | .1932 | .0370 | .0105 | 2.1014 | .8109 | .7901 | .5603 | .6686 | 1.5232 | .8193 | |
| 95 | 4.95 | 5.67 | 7.01 | 6.26 | 7.40 | .1517 | .5698 | .2569 | .0439 | .0184 | 2.0687 | .7527 | .7264 | .5524 | .6400 | 1.5484 | .7837 | |

10/TO P0/P0 EFF-AD EFF-P

INLET INLET INLET

1.2546 2.0189 87.18 88.38

STA-1 STA-2

---LOCAL---

8.0 9.0

Stator

| %SPAN | DIA-1 | DIA-2 | V-1 | V-2 | VH-1 | VH-2 | VO-1 | VO-2 | B-1 | B-2 | B*-1 | B*-2 | V*-1 | V*-2 | VO*-1 | VO*-2 | U-1 | U-2 |
|-------|--------|--------|--------|--------|--------|---------|--------|---------|--------|---------|--------|--------|--------|--------|--------|---------|--------|--------|
| IN | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | DEGREE | DEGREE | DEGREE | DEGREE | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC |
| 5 | 20.409 | 21.489 | 1011.4 | 665.0 | 682.4 | 665.0 | 746.5 | -0 | 47.57 | -00 | 19.46 | 57.40 | 723.8 | 1234.3 | -241.1 | -1039.8 | 987.6 | 1039.8 |
| 10 | 21.006 | 21.961 | 977.7 | 637.8 | 675.1 | 637.8 | 707.2 | -0 | 46.33 | -00 | 24.61 | 59.03 | 742.7 | 1239.5 | -309.3 | -1062.7 | 1016.6 | 1062.7 |
| 15 | 21.589 | 22.432 | 951.9 | 615.8 | 663.6 | 615.8 | 677.6 | -0 | 45.38 | -00 | 28.76 | 60.43 | 763.1 | 1248.0 | -367.1 | -1085.5 | 1044.7 | 1085.5 |
| 30 | 23.314 | 23.902 | 877.9 | 602.3 | 609.9 | 602.3 | 631.5 | -0 | 45.93 | -00 | 39.14 | 62.49 | 786.7 | 1304.0 | -496.7 | -1156.6 | 1123.2 | 1156.6 |
| 50 | 25.601 | 25.893 | 869.2 | 619.8 | 610.6 | 619.8 | 618.6 | -0 | 45.37 | -00 | 45.45 | 63.68 | 870.4 | 1397.9 | -620.3 | -1253.0 | 1238.8 | 1253.0 |
| 70 | 27.413 | 27.902 | 863.2 | 624.6 | 624.6 | 624.6 | 595.9 | -0 | 43.65 | -00 | 50.21 | 65.17 | 976.2 | 1487.7 | -750.2 | -1350.2 | 1346.1 | 1350.2 |
| 85 | 29.403 | 29.362 | 923.2 | 655.1 | 672.6 | 655.1 | 632.4 | -0 | 43.24 | -00 | 49.61 | 65.26 | 1038.0 | 1565.4 | -790.7 | -1421.8 | 1423.0 | 1421.8 |
| 90 | 29.914 | 29.856 | 929.8 | 662.6 | 667.7 | 662.6 | 647.1 | -0 | 44.10 | -00 | 50.17 | 65.38 | 1042.3 | 1589.2 | -800.4 | -1444.7 | 1447.5 | 1444.7 |
| 95 | 30.362 | 30.293 | 916.4 | 648.8 | 621.0 | 648.8 | 673.9 | -0 | 47.34 | -00 | 52.05 | 66.13 | 1009.8 | 1603.0 | -796.3 | -1465.9 | 1470.2 | 1465.9 |
| %SPAN | INCS | INCM | DEV | TURN | CAMBER | OMEGA-B | D-FAC | OMEGA-B | LOSS-P | LOSS-P | P02/ | EFF-P | EFF-AD | EFF-P | M-1 | M-2 | M*-1 | M*-2 |
| %SPAN | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | SHOCK | TOTAL | PROFILE | TOTAL | PROFILE | P01 | TOTAL | TOTAL | STATIC | | | | |
| 5 | 1.33 | 4.26 | 12.41 | 47.57 | 55.00 | .0057 | .5213 | .1705 | .0424 | .0410 | .9331 | .0000 | .0000 | .7642 | .8663 | .5520 | .6268 | 1.0247 |
| 10 | .93 | 3.86 | 11.47 | 46.33 | 53.90 | .0058 | .5282 | .1729 | .0441 | .0426 | .9356 | .0000 | .0000 | .7618 | .8396 | .5296 | .6444 | 1.0292 |
| 15 | 1.01 | 3.95 | 10.85 | 45.38 | 52.33 | .0067 | .5357 | .1790 | .0468 | .0451 | .9361 | .0000 | .0000 | .7474 | .8183 | .5110 | .6574 | 1.0355 |
| 30 | 3.49 | 6.48 | 11.21 | 45.99 | 50.66 | .0157 | .5134 | .1809 | .0227 | .0183 | .9749 | .0000 | .0000 | .8802 | .7488 | .4990 | .6681 | 1.0804 |
| 50 | 4.66 | 7.79 | 12.02 | 45.37 | 49.55 | .0274 | .5037 | .1691 | .0212 | .0128 | .9792 | .0000 | .0000 | .8949 | .7351 | .5106 | .7309 | 1.1516 |
| 70 | 4.07 | 7.30 | 13.46 | 43.65 | 49.85 | .0258 | .5049 | .1676 | .0224 | .0138 | .9801 | .0000 | .0000 | .8910 | .7249 | .5123 | .8161 | 1.2201 |
| 85 | 3.92 | 7.23 | 15.89 | 43.24 | 51.97 | .0257 | .5300 | .1525 | .0533 | .0443 | .9505 | .0000 | .0000 | .7582 | .7685 | .5319 | .8637 | 1.2711 |
| 90 | 4.50 | 7.82 | 17.53 | 44.10 | 53.67 | .0272 | .5355 | .1478 | .0525 | .0429 | .9518 | .0000 | .0000 | .7707 | .7729 | .5354 | .8669 | 1.2853 |
| 95 | 7.56 | 10.92 | 19.89 | 47.34 | 56.01 | .0389 | .5576 | .1327 | .0478 | .0338 | .9583 | .0000 | .0000 | .7844 | .7570 | .5203 | .8317 | 1.2856 |
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10/TO P0/P0 EFF-AD EFF-P

INLET INLET INLET

1.2546 1.9471 82.25 83.63 39.53

STA-1 STA-2

---LOCAL---

10.0 11.0

TABLE 9.6

BLADE-ELEMENT AND OVERALL PERFORMANCE WITH UNIFORM INLET
100 PERCENT OF DESIGN SPEED

Rotor

| %SPAN | DIA-1 IN | DIA-2 IN | V-1 FT/SEC | V-2 FT/SEC | VM-1 FT/SEC | VM-2 FT/SEC | VO-1 FT/SEC | VO-2 FT/SEC | B-1 DEGREE | B-2 DEGREE | B*-1 DEGREE | B*-2 DEGREE | V*-1 FT/SEC | V*-2 FT/SEC | VO*-1 FT/SEC | VO*-2 FT/SEC | U-1 FT/SEC | U-2 FT/SEC |
|-------|-------------|-------------|---------------|---------------|----------------|----------------|----------------|----------------|---------------|---------------|----------------|----------------|----------------|----------------|-----------------|-----------------|---------------|---------------|
| 5 | 17.467 | 19.769 | 553.9 | 973.2 | 553.9 | 592.1 | 0 | 772.3 | 0.00 | 52.52 | 56.79 | 17.39 | 1011.4 | 620.5 | -846.3 | -185.4 | 846.3 | 957.8 |
| 10 | 18.467 | 20.408 | 567.7 | 936.4 | 567.7 | 586.5 | 0 | 729.9 | 0.00 | 51.21 | 57.50 | 23.79 | 1059.6 | 641.3 | -894.7 | -258.8 | 894.7 | 988.7 |
| 15 | 19.467 | 21.047 | 580.4 | 911.5 | 580.4 | 585.5 | 0 | 695.2 | 0.00 | 47.70 | 58.37 | 28.83 | 1107.4 | 673.4 | -947.1 | -324.5 | 947.1 | 1019.7 |
| 30 | 22.314 | 22.864 | 606.1 | 828.6 | 606.1 | 519.0 | 0 | 646.0 | 0.00 | 51.22 | 60.72 | 41.93 | 1239.4 | 698.1 | -1081.1 | -466.6 | 1081.1 | 1112.6 |
| 50 | 25.791 | 25.520 | 617.8 | 811.0 | 617.8 | 513.9 | 0 | 627.3 | 0.00 | 50.67 | 63.69 | 49.84 | 1393.9 | 797.0 | -1249.5 | -609.1 | 1249.5 | 1236.4 |
| 70 | 28.954 | 28.076 | 612.0 | 790.1 | 612.0 | 499.9 | 0 | 611.9 | 0.00 | 50.75 | 66.33 | 56.24 | 1530.5 | 900.0 | -1402.8 | -748.3 | 1402.8 | 1360.2 |
| 85 | 31.295 | 29.993 | 594.2 | 832.8 | 594.2 | 520.6 | 0 | 649.9 | 0.00 | 51.30 | 68.60 | 57.05 | 1628.5 | 957.2 | -1516.2 | -803.2 | 1516.2 | 1453.1 |
| 90 | 31.883 | 30.630 | 587.6 | 828.7 | 587.6 | 489.1 | 0 | 668.9 | 0.00 | 53.83 | 69.17 | 59.04 | 1652.7 | 950.7 | -1544.7 | -815.1 | 1544.7 | 1480.4 |
| 95 | 32.499 | 31.271 | 581.3 | 798.4 | 581.3 | 428.7 | 0 | 673.6 | 0.00 | 57.53 | 69.74 | 63.00 | 1676.4 | 944.4 | -1571.5 | -841.5 | 1571.5 | 1515.0 |

Stator

| %SPAN | INCS DEGREE | INCH DEGREE | DEV DEGREE | TURN DEGREE | CAMBER DEGREE | OMEGA-B SHOCK | D-FAC | OMEGA-B | LOSS-P TOTAL | LOSS-P PROFILE | PO2/ TOTAL | EFF-P TOTAL | EFF-AD TOTAL | EFF-P STATIC | M-1 | M-2 | M*-1 | M*-2 |
|-------|----------------|----------------|---------------|----------------|------------------|------------------|-------|---------|-----------------|-------------------|---------------|----------------|-----------------|-----------------|------|------|--------|------|
| 5 | 1.39 | 7.82 | 15.52 | 39.41 | 47.12 | 0.166 | 5646 | 0.029 | 0.061 | 0.006 | 2.0815 | 9830 | 98.12 | 9738 | 5094 | 8368 | 9.315 | 5335 |
| 10 | 1.59 | 7.98 | 14.14 | 33.82 | 39.97 | 0.198 | 5612 | 0.024 | 0.051 | 0.003 | 2.0499 | 9842 | 98.25 | 9774 | 5238 | 8031 | 9.609 | 5500 |
| 15 | 1.83 | 7.74 | 12.30 | 29.57 | 34.02 | 0.236 | 5487 | 0.110 | 0.023 | -0.007 | 2.0364 | 9912 | 99.02 | 9882 | 5363 | 7806 | 1.0279 | 5767 |
| 30 | 2.80 | 6.81 | 12.20 | 18.79 | 24.19 | 0.456 | 5792 | 0.094 | 0.189 | 0.097 | 1.9590 | 9255 | 91.80 | 9117 | 5601 | 7013 | 1.1504 | 5908 |
| 50 | 4.05 | 6.73 | 7.48 | 13.85 | 14.59 | 0.812 | 5649 | 0.128 | 0.252 | 0.093 | 1.9918 | 8854 | 87.37 | 8710 | 5709 | 6795 | 1.2856 | 6678 |
| 70 | 4.91 | 6.79 | 5.65 | 10.19 | 9.05 | 1.136 | 5453 | 0.163 | 0.304 | 0.092 | 2.0123 | 8438 | 82.75 | 8289 | 5858 | 6554 | 1.4060 | 7466 |
| 85 | 5.21 | 6.51 | 2.83 | 11.55 | 7.91 | 1.359 | 5540 | 0.201 | 0.398 | 0.134 | 2.1128 | 8071 | 78.58 | 7816 | 5506 | 6837 | 1.4907 | 7858 |
| 90 | 5.31 | 6.42 | 3.87 | 10.13 | 7.59 | 1.432 | 5712 | 0.202 | 0.456 | 0.190 | 2.1167 | 7745 | 74.98 | 7470 | 5430 | 6757 | 1.5174 | 7752 |
| 95 | 5.51 | 6.43 | 7.10 | 6.74 | 7.41 | 1.538 | 5851 | 0.2763 | 0.471 | 0.0212 | 2.0829 | 7398 | 7.120 | 7.154 | 5360 | 6466 | 1.5423 | 7649 |

TO/TO PO/PO EFF-AD EFF-P
INLET INLET INLET INLET

1.2606 2.0277 85.74 87.09

Stator

| %SPAN | DIA-1 IN | DIA-2 IN | V-1 FT/SEC | V-2 FT/SEC | VM-1 FT/SEC | VM-2 FT/SEC | VO-1 FT/SEC | VO-2 FT/SEC | B-1 DEGREE | B-2 DEGREE | B*-1 DEGREE | B*-2 DEGREE | VO*-1 FT/SEC | VO*-2 FT/SEC | U-1 FT/SEC | U-2 FT/SEC | | |
|-------|-------------|-------------|---------------|---------------|----------------|----------------|----------------|----------------|---------------|---------------|----------------|----------------|-----------------|-----------------|---------------|---------------|--------|--------|
| 5 | 20.409 | 21.489 | 1009.4 | 669.3 | 677.7 | 661.8 | 748.1 | -99.8 | 47.83 | -0.21 | 19.55 | 59.88 | 719.2 | 1319.0 | -240.7 | 1140.9 | 988.8 | 1041.1 |
| 10 | 21.008 | 21.961 | 974.3 | 641.4 | 668.2 | 634.2 | 708.9 | -95.7 | 46.69 | -3.6 | 24.79 | 61.32 | 736.3 | 1321.9 | -308.9 | 1159.7 | 1017.8 | 1064.0 |
| 15 | 21.589 | 22.432 | 950.6 | 620.0 | 666.5 | 613.0 | 677.7 | -92.5 | 45.48 | -5.5 | 28.92 | 62.53 | 761.8 | 1329.2 | -368.3 | 1179.3 | 1046.0 | 1086.8 |
| 30 | 23.314 | 23.902 | 876.4 | 606.2 | 602.2 | 599.4 | 636.7 | -90.5 | 46.60 | 0.6 | 31.28 | 64.35 | 778.3 | 1385.0 | -492.8 | 1248.5 | 1129.5 | 1158.0 |
| 50 | 25.601 | 25.893 | 870.4 | 623.0 | 604.5 | 616.0 | 626.2 | -93.1 | 46.01 | -1.3 | 45.44 | 65.43 | 861.7 | 1481.7 | -614.1 | 1347.5 | 1240.3 | 1254.5 |
| 70 | 27.818 | 27.902 | 870.4 | 621.4 | 611.6 | 624.3 | 619.2 | -94.4 | 45.35 | 0.0 | 49.98 | 66.65 | 951.2 | 1575.2 | -728.5 | 1446.2 | 1347.7 | 1351.8 |
| 85 | 29.408 | 29.382 | 933.8 | 662.3 | 653.8 | 654.9 | 666.8 | -99.0 | 45.56 | 2.5 | 49.22 | 66.73 | 1001.0 | 1657.4 | -758.0 | 1522.5 | 1424.8 | 1423.5 |
| 90 | 29.914 | 29.856 | 937.8 | 667.5 | 636.6 | 660.0 | 688.6 | -99.8 | 47.24 | 3.3 | 50.07 | 66.88 | 992.0 | 1681.2 | -760.7 | 1546.3 | 1449.3 | 1446.5 |
| 95 | 30.382 | 30.293 | 919.4 | 651.1 | 603.6 | 643.8 | 693.5 | -97.3 | 48.97 | 3.0 | 52.21 | 67.64 | 985.1 | 1692.2 | -778.5 | 1565.0 | 1472.0 | 1467.7 |

STA-1 STA-2
---LOCAL---

8.0 9.0

Stator

| %SPAN | INCS DEGREE | INCM DEGREE | DEV DEGREE | TURN DEGREE | CAMBER DEGREE | OMEGA-B SHOCK | D-FAC | OMEGA-B TOTAL | LOSS-P PROFILE | PO2/ PO1 | EFF-P TOTAL | EFF-AD TOTAL | EFF-P STATIC | M-1 | M-2 | M ⁰ -1 | M ⁰ -2 |
|-------|----------------|----------------|---------------|----------------|------------------|------------------|-------|------------------|-------------------|-------------|----------------|-----------------|-----------------|------|------|-------------------|-------------------|
| 5 | 1.63 | 4.56 | 12.20 | 56.41 | 55.90 | 0.062 | 5417 | 0.1782 | 0.0438 | 0.9303 | 0.0000 | 0.0000 | 7495 | 8636 | 5557 | 6.216 | 1.0550 |
| 10 | 1.23 | 4.16 | 7.85 | 55.27 | 53.89 | 0.065 | 5488 | 0.1787 | 0.0451 | 0.9339 | 0.0000 | 0.0000 | 7505 | 8366 | 5326 | 6.373 | 1.0775 |
| 15 | 1.10 | 4.04 | 5.42 | 54.06 | 52.33 | 0.068 | 5566 | 0.1891 | 0.0484 | 0.9327 | 0.0000 | 0.0000 | 7295 | 8172 | 5145 | 6.560 | 1.1031 |
| 30 | 4.08 | 7.07 | 11.82 | 55.18 | 50.66 | 0.180 | 5390 | 0.0891 | 0.0247 | 0.9725 | 0.0000 | 0.0000 | 8671 | 7467 | 5020 | 6.597 | 1.1469 |
| 50 | 5.27 | 8.40 | 10.34 | 54.60 | 49.56 | 0.313 | 5363 | 0.0811 | 0.0246 | 0.9756 | 0.0000 | 0.0000 | 8774 | 7352 | 5127 | 7.221 | 1.2194 |
| 70 | 5.72 | 8.95 | 13.41 | 53.95 | 49.85 | 0.370 | 5461 | 0.0831 | 0.0272 | 0.9753 | 0.0000 | 0.0000 | 8695 | 7281 | 5160 | 7.221 | 1.2373 |
| 85 | 6.10 | 9.41 | 18.41 | 54.16 | 51.98 | 0.408 | 5775 | 0.1715 | 0.0593 | 0.9438 | 0.0000 | 0.0000 | 7368 | 7728 | 5399 | 8.299 | 1.3385 |
| 90 | 7.50 | 10.82 | 20.70 | 55.84 | 53.67 | 0.484 | 5872 | 0.1653 | 0.0581 | 0.9460 | 0.0000 | 0.0000 | 7464 | 7744 | 5361 | 8.209 | 1.3502 |
| 95 | 9.23 | 12.59 | 22.69 | 57.56 | 56.01 | 0.513 | 6023 | 0.1519 | 0.0542 | 0.9523 | 0.0000 | 0.0000 | 7478 | 7570 | 5202 | 8.075 | 1.3521 |

NCORR WCORR TO/TO PO/PO EFF-AD EFF-P WCI/A1
INLET INLET INLET INLET INLET INLET LBM/SEC
RPM LBM/SEC \$ \$ SQFT
11104, 173.18 1.2606 1.9475 80.36 82.12 38.88

STA-1 STA-2
---LOCAL---

10.0 11.0

TABLE 10.1

**BLADE-ELEMENT AND OVERALL PERFORMANCE WITH UNIFORM INLET
FREE STREAM EFFICIENCY METHOD, 100 PERCENT OF DESIGN SPEED**

Rotor

| %SPAN | DIA-1 IN | DIA-2 IN | V-1 FT/SEC | V-2 FT/SEC | VM-1 FT/SEC | VM-2 FT/SEC | VO-1 FT/SEC | VO-2 FT/SEC | B-1 DEGREE | B-2 DEGREE | B-1-1 DEGREE | B-1-2 DEGREE | V-1-1 FT/SEC | V-1-2 FT/SEC | VO-1-1 FT/SEC | VO-1-2 FT/SEC | U-1 FT/SEC | U-2 FT/SEC |
|-------|-------------|-------------|---------------|---------------|----------------|----------------|----------------|----------------|---------------|---------------|-----------------|-----------------|-----------------|-----------------|------------------|------------------|---------------|---------------|
| 5 | 17.467 | 19.769 | 586.7 | 1041.4 | 586.7 | 737.1 | 0 | 735.6 | 0.00 | 44.94 | 55.22 | 16.66 | 1028.6 | 769.4 | -844.8 | -220.5 | 844.8 | 956.2 |
| 10 | 18.467 | 20.408 | 603.0 | 972.2 | 602.0 | 692.4 | 0 | 692.4 | 0.00 | 45.44 | 56.02 | 23.41 | 1077.1 | 744.1 | -893.2 | -294.7 | 893.2 | 987.1 |
| 15 | 19.467 | 21.047 | 615.3 | 908.9 | 615.3 | 626.7 | 0 | 658.2 | 0.00 | 46.40 | 56.83 | 29.82 | 1124.8 | 723.1 | -941.6 | -359.8 | 941.6 | 1018.0 |
| 30 | 22.314 | 22.964 | 645.6 | 878.6 | 645.6 | 657.7 | 0 | 582.6 | 0.00 | 41.53 | 59.11 | 38.73 | 1257.6 | 843.8 | -1079.3 | -528.1 | 1079.3 | 1110.7 |
| 50 | 25.791 | 25.520 | 662.2 | 825.4 | 662.2 | 639.7 | 0 | 521.7 | 0.00 | 39.19 | 62.03 | 48.05 | 1412.4 | 958.1 | -1247.4 | -711.7 | 1247.4 | 1234.3 |
| 70 | 28.954 | 28.076 | 648.5 | 753.0 | 648.5 | 593.9 | 0 | 462.9 | 0.00 | 37.94 | 65.15 | 56.42 | 1543.3 | 1074.4 | -1400.4 | -895.1 | 1400.4 | 1358.0 |
| 85 | 31.295 | 29.993 | 623.3 | 705.7 | 623.3 | 538.9 | 0 | 455.6 | 0.00 | 40.21 | 67.62 | 61.56 | 1637.0 | 1131.7 | -1513.7 | -995.1 | 1513.7 | 1450.7 |
| 90 | 31.883 | 30.630 | 616.5 | 691.4 | 616.5 | 509.8 | 0 | 466.5 | 0.00 | 42.50 | 68.21 | 63.34 | 1660.8 | 1136.1 | -1542.1 | -1015.0 | 1542.1 | 1481.5 |
| 95 | 32.499 | 31.271 | 611.0 | 638.3 | 611.0 | 428.2 | 0 | 473.5 | 0.00 | 47.88 | 68.76 | 67.61 | 1686.5 | 1123.8 | -1571.9 | -1039.0 | 1571.9 | 1512.5 |

| %SPAN | INCS | INCM | DEV | TURN | CHAMBER | OMEGA-R | D-FAC | OMEGA-B | LOSS-P | LOSS-P | PO2/ | EFF-P | EFF-AD | EFF-P | M-1 | M-2 | M-1-1 | M-1-2 |
|-------|-------|------|-------|-------|---------|---------|--------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 5 | -0.1A | 6.25 | 14.79 | 38.56 | 47.12 | 0.126 | 0.188 | 0.059 | 0.0126 | 0.009 | 1.9880 | 0.9642 | 0.9605 | 0.9340 | 0.5424 | 0.9095 | 0.9533 | 0.6720 |
| 10 | 0.3 | 6.39 | 13.77 | 32.61 | 39.97 | 0.155 | 0.4644 | 0.1358 | 0.0287 | 0.024 | 1.8835 | 0.9120 | 0.9040 | 0.8611 | 0.5588 | 0.8429 | 1.0053 | 0.6452 |
| 15 | 0.30 | 6.14 | 13.30 | 27.02 | 34.02 | 0.199 | 0.5032 | 0.1963 | 0.0409 | 0.0367 | 1.7957 | 0.8586 | 0.8467 | 0.8065 | 0.5715 | 0.7826 | 1.0510 | 0.6226 |
| 30 | 1.19 | 5.19 | 9.02 | 20.38 | 24.20 | 0.418 | 0.4556 | 0.1175 | 0.0247 | 0.0158 | 1.8066 | 0.8955 | 0.8868 | 0.8687 | 0.5997 | 0.7560 | 1.1739 | 0.7260 |
| 50 | 2.50 | 5.12 | 5.78 | 13.98 | 14.66 | 0.774 | 0.4337 | 0.1244 | 0.0254 | 0.0054 | 1.7677 | 0.8655 | 0.8555 | 0.8489 | 0.6146 | 0.7059 | 1.3189 | 0.8193 |
| 70 | 3.74 | 5.52 | 5.94 | 8.73 | 9.15 | 1.104 | 0.4036 | 0.1488 | 0.0278 | 0.0069 | 1.6878 | 0.8136 | 0.7993 | 0.8042 | 0.5996 | 0.6401 | 1.4374 | 0.9132 |
| 85 | 4.26 | 5.49 | 7.47 | 6.06 | 8.04 | 1.328 | 0.4071 | 0.2047 | 0.0352 | 0.0194 | 1.6350 | 0.7300 | 0.7107 | 0.7245 | 0.5766 | 0.5942 | 1.5128 | 0.9529 |
| 90 | 4.40 | 5.46 | 8.27 | 4.87 | 7.68 | 1.401 | 0.4173 | 0.2410 | 0.0398 | 0.0144 | 1.6198 | 0.6876 | 0.6657 | 0.6843 | 0.5692 | 0.5789 | 1.5359 | 0.9513 |
| 95 | 4.56 | 5.45 | 11.78 | 1.15 | 7.48 | 1.506 | 0.4368 | 0.2920 | 0.0417 | 0.0201 | 1.5669 | 0.6201 | 0.5954 | 0.6325 | 0.5642 | 0.5301 | 1.5579 | 0.9332 |

TO/TO PO/PO EFF-AD EFF-P
INLET INLET INLET INLET

1.2107 1.7465 81.91 83.26

STA-1 STA-2
---LOCAL---

8.0 9.0

Stator

| %SPAN | DIA-1 IN | DIA-2 IN | V-1 FT/SEC | V-2 FT/SEC | VM-1 FT/SEC | VM-2 FT/SEC | VO-1 FT/SEC | VO-2 FT/SEC | B-1 DEGREE | B-2 DEGREE | B-1-1 DEGREE | B-1-2 DEGREE | V-1-1 FT/SEC | V-1-2 FT/SEC | VO-1-1 FT/SEC | VO-1-2 FT/SEC | U-1 FT/SEC | U-2 FT/SEC |
|-------|-------------|-------------|---------------|---------------|----------------|----------------|----------------|----------------|---------------|---------------|-----------------|-----------------|-----------------|-----------------|------------------|------------------|---------------|---------------|
| 5 | 20.409 | 21.489 | 1108.5 | 959.0 | 1097.0 | 957.9 | 712.7 | -46.6 | 40.01 | -2.79 | 17.91 | 48.59 | 892.3 | 1448.1 | -274.4 | -1086.0 | 987.1 | 1039.4 |
| 10 | 21.008 | 21.961 | 1043.1 | 928.4 | 997.0 | 927.6 | 672.9 | -38.4 | 40.19 | -2.37 | 23.33 | 49.88 | 868.2 | 1439.4 | -343.2 | -1100.6 | 1016.1 | 1062.2 |
| 15 | 21.589 | 22.432 | 983.7 | 903.0 | 945.6 | 903.0 | 641.7 | -34.4 | 40.71 | -2.18 | 28.34 | 51.10 | 847.6 | 1438.3 | -402.6 | -1119.4 | 1044.2 | 1085.0 |
| 30 | 23.314 | 23.902 | 957.3 | 875.4 | 966.3 | 875.1 | 573.8 | -22.6 | 36.82 | -1.48 | 35.84 | 53.40 | 945.8 | 1468.1 | -553.8 | -1178.7 | 1127.6 | 1156.3 |
| 50 | 25.601 | 25.893 | 914.9 | 837.9 | 952.8 | 837.6 | 519.9 | -20.4 | 34.93 | -1.41 | 43.63 | 56.64 | 1040.9 | 1523.9 | -719.3 | -1272.8 | 1238.3 | 1252.4 |
| 70 | 27.818 | 27.902 | 866.0 | 770.8 | 929.2 | 768.1 | 467.0 | -14.2 | 32.54 | -4.78 | 50.30 | 61.48 | 1141.8 | 1609.0 | -878.5 | -1413.7 | 1345.5 | 1349.5 |
| 85 | 29.408 | 29.382 | 847.3 | 715.4 | 908.7 | 712.1 | 464.4 | -8.3 | 33.23 | -5.47 | 53.51 | 64.45 | 1191.7 | 1650.9 | -958.0 | -1489.4 | 1422.4 | 1421.1 |
| 90 | 29.914 | 29.856 | 844.9 | 702.5 | 896.7 | 701.0 | 477.8 | -46.1 | 34.45 | -3.76 | 54.29 | 64.81 | 1193.6 | 1646.8 | -965.1 | -1490.1 | 1446.9 | 1444.1 |
| 95 | 30.382 | 30.293 | 811.5 | 687.9 | 847.0 | 686.9 | 487.3 | -36.4 | 36.90 | -3.03 | 56.55 | 65.42 | 1177.2 | 1651.3 | -982.2 | -1501.6 | 1469.5 | 1465.2 |

| %SPAN | INCS | INCM | DEV | TURN | CHAMBER | OMEGA-B | D-FAC | OMEGA-B | LOSS-P | LOSS-P | PO2/ | EFF-P | EFF-AD | EFF-P | M-1 | M-2 | M-1-1 | M-1-2 |
|-------|-------|-------|-------|-------|---------|---------|--------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 5 | -5.92 | -3.00 | 9.62 | 42.80 | 55.89 | 0.000 | 0.3014 | 0.2533 | 0.0629 | 0.0629 | 0.8838 | 0.0000 | 0.0000 | 0.2510 | 0.9639 | 0.8274 | 0.7792 | 1.2494 |
| 10 | -4.75 | -1.82 | 9.08 | 42.55 | 53.86 | 0.000 | 0.2805 | 0.1958 | 0.0499 | 0.0499 | 0.9181 | 0.0000 | 0.0000 | 0.2933 | 0.8993 | 0.8002 | 0.7531 | 1.2407 |
| 15 | -3.75 | -0.81 | 8.74 | 42.89 | 52.40 | 0.009 | 0.2579 | 0.1271 | 0.0332 | 0.0330 | 0.9516 | 0.0000 | 0.0000 | 0.3764 | 0.8531 | 0.7777 | 0.7411 | 1.2378 |
| 30 | -5.65 | -2.65 | 9.74 | 38.30 | 50.68 | 0.005 | 0.2584 | 0.1595 | 0.0446 | 0.0446 | 0.9417 | 0.0000 | 0.0000 | 0.2365 | 0.8302 | 0.7530 | 0.8266 | 1.2628 |
| 50 | -6.08 | -2.95 | 10.63 | 36.04 | 49.60 | 0.005 | 0.2642 | 0.1616 | 0.0493 | 0.0493 | 0.9453 | 0.0000 | 0.0000 | 0.1968 | 0.7899 | 0.7177 | 0.9027 | 1.3053 |
| 70 | -7.03 | -3.79 | 8.70 | 37.42 | 49.92 | 0.001 | 0.3131 | 0.1770 | 0.0595 | 0.0595 | 0.9453 | 0.0000 | 0.0000 | 0.2949 | 0.7456 | 0.6564 | 0.9842 | 1.3703 |
| 85 | -6.25 | -2.94 | 10.44 | 38.71 | 52.04 | 0.000 | 0.3756 | 0.2091 | 0.0728 | 0.0728 | 0.9383 | 0.0000 | 0.0000 | 0.3915 | 0.7247 | 0.6031 | 1.0192 | 1.3917 |
| 90 | -5.33 | -2.01 | 13.64 | 38.21 | 53.58 | 0.001 | 0.3891 | 0.2117 | 0.0751 | 0.0750 | 0.9383 | 0.0000 | 0.0000 | 0.4316 | 0.7228 | 0.6031 | 1.0193 | 1.3809 |
| 95 | -3.00 | -0.37 | 16.66 | 39.94 | 56.04 | 0.001 | 0.3855 | 0.1489 | 0.0536 | 0.0536 | 0.9598 | 0.0000 | 0.0000 | 0.5585 | 0.6890 | 0.5739 | 0.9959 | 1.3777 |

STA-1 STA-2
---LOCAL---

10.0 11.0

NCORR WCORR TO/TO PO/PO EFF-AD EFF-P WC1/A1
INLET INLET INLET INLET INLET LBM/SEC
RPM LBM/SEC
11085. 180.06 1.2107 1.6432 72.30 74.16 42.02

TABLE 10.2

BLADE-ELEMENT AND OVERALL PERFORMANCE WITH UNIFORM INLET
FREE STREAM EFFICIENCY METHOD, 100 PERCENT OF DESIGN SPEED

Rotor

| %SPAN | DIA-1 | DIA-2 | V-1 | V-2 | VM-1 | VM-2 | VO-1 | VO-2 | B-1 | B-2 | B-1-1 | B-1-2 | V-1-1 | V-1-2 | VO-1-1 | VO-1-2 | U-1 | U-2 |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|--------|--------|--------|
| | IN | IN | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | DEGREE | DEGREE | DEGREE | DEGREE | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC |
| 5 | 17.467 | 19.769 | 580.4 | 994.5 | 480.4 | 661.7 | 0 | 742.5 | 0.00 | 48.29 | 55.50 | 17.488 | 1024.8 | 695.3 | -844.6 | -213.4 | 844.6 | 955.9 |
| 10 | 18.467 | 20.408 | 595.2 | 925.2 | 495.2 | 603.0 | 0 | 701.6 | 0.00 | 49.12 | 56.31 | 25.29 | 1073.2 | 667.4 | -893.0 | -285.2 | 893.0 | 986.8 |
| 15 | 19.467 | 21.047 | 608.5 | 889.7 | 408.5 | 594.4 | 0 | 661.9 | 0.00 | 48.08 | 57.12 | 30.87 | 1120.9 | 693.0 | -941.3 | -355.8 | 941.3 | 1017.7 |
| 30 | 22.314 | 22.964 | 639.5 | 850.8 | 439.5 | 597.9 | 0 | 605.3 | 0.00 | 45.35 | 59.34 | 40.17 | 1254.3 | 782.9 | -1079.0 | -505.1 | 1079.0 | 1110.4 |
| 50 | 25.791 | 25.520 | 657.0 | 811.8 | 457.0 | 590.5 | 0 | 557.1 | 0.00 | 43.13 | 62.22 | 48.88 | 1409.6 | 898.5 | -1247.1 | -678.9 | 1247.1 | 1234.0 |
| 70 | 28.954 | 28.076 | 646.0 | 765.8 | 446.0 | 561.7 | 0 | 520.4 | 0.00 | 42.81 | 65.23 | 56.14 | 1541.9 | 1008.3 | -1400.1 | -837.2 | 1400.1 | 1357.6 |
| 85 | 31.295 | 29.993 | 621.8 | 755.0 | 421.8 | 514.6 | 0 | 552.3 | 0.00 | 47.63 | 67.66 | 60.19 | 1636.1 | 1035.0 | -1513.3 | -898.0 | 1513.3 | 1450.3 |
| 90 | 31.883 | 30.630 | 615.0 | 751.5 | 415.0 | 491.2 | 0 | 577.1 | 0.00 | 50.42 | 68.25 | 61.98 | 1659.9 | 1024.3 | -1541.7 | -904.0 | 1541.7 | 1491.1 |
| 95 | 32.999 | 31.271 | 609.4 | 709.5 | 409.4 | 411.6 | 0 | 577.9 | 0.00 | 54.54 | 68.81 | 66.22 | 1685.5 | 1020.9 | -1571.5 | -934.2 | 1571.5 | 1512.1 |

TO/T0 PO/PO EFF-AD EFF-P

INLET INLET INLET INLET

1.2307 1.8838 85.89 87.08

Stator

| %SPAN | DIA-1 | DIA-2 | V-1 | V-2 | VM-1 | VM-2 | VO-1 | VO-2 | B-1 | B-2 | B-1-1 | B-1-2 | V-1-1 | V-1-2 | VO-1-1 | VO-1-2 | U-1 | U-2 |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|--------|--------|
| | IN | IN | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | DEGREE | DEGREE | DEGREE | DEGREE | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC |
| 5 | 20.409 | 21.469 | 1045.8 | 788.0 | 759.1 | 787.8 | 719.2 | -15.9 | 43.45 | -1.16 | 19.42 | 53.25 | 805.0 | 1316.7 | -267.6 | -1055.0 | 986.9 | 1039.1 |
| 10 | 21.008 | 21.961 | 980.0 | 749.2 | 704.0 | 748.8 | 681.6 | -25.5 | 44.07 | -1.96 | 25.38 | 55.45 | 779.6 | 1320.5 | -334.2 | -1087.4 | 1015.8 | 1061.9 |
| 15 | 21.598 | 22.432 | 947.0 | 718.9 | 693.2 | 718.4 | 645.2 | -26.8 | 42.94 | -2.13 | 29.89 | 57.12 | 799.9 | 1323.5 | -398.7 | -1111.5 | 1043.9 | 1089.7 |
| 30 | 23.314 | 23.902 | 913.3 | 709.5 | 691.8 | 709.4 | 596.3 | -6.1 | 40.76 | -0.49 | 37.49 | 58.59 | 872.3 | 1361.4 | -531.0 | -1161.9 | 1127.4 | 1155.8 |
| 50 | 25.601 | 25.893 | 884.4 | 701.5 | 688.2 | 701.5 | 555.5 | -8.8 | 38.91 | -0.07 | 44.74 | 60.75 | 969.4 | 1436.0 | -682.5 | -1252.9 | 1237.9 | 1252.1 |
| 70 | 27.818 | 27.902 | 858.6 | 664.1 | 678.8 | 663.2 | 525.7 | -33.6 | 37.75 | -2.90 | 50.36 | 64.38 | 1064.1 | 1533.6 | -819.4 | -1382.8 | 1345.1 | 1349.2 |
| 85 | 29.408 | 29.382 | 870.9 | 635.6 | 663.5 | 635.6 | 569.0 | 5.2 | 40.37 | 0.47 | 59.29 | 65.82 | 1084.6 | 1551.7 | -858.0 | -1415.5 | 1422.0 | 1420.8 |
| 90 | 29.914 | 29.856 | 876.0 | 637.4 | 646.2 | 636.6 | 591.4 | 32.0 | 42.47 | 2.88 | 52.93 | 65.73 | 1071.8 | 1548.6 | -855.1 | -1411.7 | 1446.5 | 1443.7 |
| 95 | 30.392 | 30.293 | 849.1 | 597.2 | 605.9 | 595.9 | 594.9 | 39.0 | 44.48 | 3.75 | 55.28 | 67.32 | 1063.7 | 1545.3 | -874.2 | -1425.8 | 1469.1 | 1464.8 |

NCORR WCORR TO/T0 PO/PO EFF-AD EFF-P WCI/VI

INLET INLET INLET INLET INLET INLET

11082. 179.31 1.2307 1.8774 81.40 82.90 40.25

STA-1 STA-2

---LOCAL---

10.0 11.0

TABLE 10.3

BLADE-ELEMENT AND OVER ALL PERFORMANCE WITH UNIFORM INLET
FREE STREAM EFFICIENCY METHOD, 100 PERCENT OF DESIGN SPEED

Rotor

| %SPAN | DIA-1 | DIA-2 | V-1 | V-2 | VM-1 | VM-2 | VO-1 | VO-2 | B-1 | B-2 | B*-1 | B*-2 | V*-1 | V*-2 | VO*-1 | VO*-2 | U-1 | U-2 |
|-------|--------|--------|-------|-------|-------|-------|------|-------|-----|-------|-------|-------|--------|--------|---------|--------|--------|--------|
| 5 | 17.467 | 19.769 | 570.4 | 965.5 | 570.4 | 603.9 | .0 | 753.3 | .00 | 51.28 | 55.98 | 18.59 | 1019.6 | 637.2 | -845.1 | -203.1 | 845.1 | 956.5 |
| 10 | 18.467 | 20.408 | 584.4 | 911.0 | 584.4 | 556.0 | .0 | 712.2 | .00 | 51.43 | 56.81 | 25.84 | 1067.6 | 631.2 | -893.5 | -275.1 | 893.5 | 987.4 |
| 15 | 19.467 | 21.047 | 597.4 | 875.2 | 597.4 | 556.3 | .0 | 675.6 | .00 | 50.53 | 57.61 | 31.63 | 1115.3 | 653.2 | -941.8 | -342.7 | 941.8 | 1018.3 |
| 30 | 22.314 | 22.964 | 628.4 | 842.9 | 628.4 | 572.2 | .0 | 618.9 | .00 | 47.24 | 59.80 | 40.69 | 1249.1 | 754.8 | -1079.6 | -492.2 | 1079.6 | 1111.0 |
| 50 | 25.791 | 25.520 | 647.9 | 814.0 | 647.9 | 561.6 | .0 | 589.2 | .00 | 46.37 | 62.56 | 48.97 | 1406.0 | 855.7 | -1247.8 | -645.5 | 1247.8 | 1234.7 |
| 70 | 28.954 | 28.076 | 641.4 | 780.8 | 641.4 | 549.9 | .0 | 559.9 | .00 | 50.30 | 67.71 | 59.67 | 1636.4 | 986.2 | -1514.1 | -851.2 | 1514.1 | 1451.1 |
| 85 | 31.295 | 29.993 | 620.6 | 779.7 | 620.6 | 497.9 | .0 | 531.2 | .00 | 51.40 | 68.29 | 59.37 | 1660.3 | 988.7 | -1542.6 | -850.7 | 1542.6 | 1481.9 |
| 90 | 31.883 | 30.630 | 614.1 | 807.6 | 614.1 | 503.8 | .0 | 631.2 | .00 | 53.46 | 68.88 | 63.16 | 1685.6 | 1000.3 | -1572.4 | -872.5 | 1572.4 | 1512.9 |
| 95 | 32.499 | 31.271 | 607.5 | 767.3 | 607.5 | 451.5 | .0 | 620.2 | .00 | 51.90 | 68.88 | 63.16 | 1685.6 | 1000.3 | -1572.4 | -872.5 | 1572.4 | 1512.9 |

| %SPAN | INCS | INCM | DEV | TURN | CAMBER | OMEGA-B | D-FAC | OMEGA-B | LOSS-P | LOSS-P | PO2/ | EFF-P | EFF-AD | EFF-P | M-1 | M-2 | M*-1 | M*-2 |
|-------|------|------|-------|-------|--------|---------|-------|---------|--------|--------|--------|-------|--------|-------|-------|-------|--------|-------|
| 5 | .57 | 7.00 | 16.72 | 37.39 | 47.12 | .0144 | .5473 | .0773 | .0161 | .0131 | 2.0061 | .9560 | .9513 | .9316 | .5251 | .8316 | .9395 | .5488 |
| 10 | .78 | 7.20 | 16.17 | 30.97 | 39.95 | .0175 | .5699 | .1096 | .0227 | .0190 | 1.9421 | .9316 | .9249 | .9046 | .5394 | .7807 | .9870 | .5409 |
| 15 | 1.00 | 7.04 | 15.12 | 25.99 | 34.05 | .0216 | .5654 | .1044 | .0214 | .0169 | 1.9125 | .9283 | .9215 | .9066 | .5515 | .7482 | 1.0310 | .5586 |
| 30 | 1.79 | 5.88 | 10.95 | 19.11 | 24.19 | .0431 | .5311 | .0680 | .0139 | .0051 | 1.9315 | .9429 | .9374 | .9321 | .5810 | .7178 | 1.1542 | .6427 |
| 50 | 2.90 | 5.60 | 6.61 | 13.59 | 14.60 | .0785 | .5186 | .0758 | .0192 | .0035 | 1.9487 | .9083 | .8991 | .8985 | .6005 | .6869 | 1.2597 | .7221 |
| 70 | 3.90 | 5.75 | 5.04 | 9.77 | 9.06 | .1108 | .4876 | .1148 | .0219 | .0008 | 1.9453 | .8782 | .8662 | .8699 | .5746 | .6541 | 1.4243 | .8161 |
| 85 | 4.32 | 5.60 | 5.49 | 8.04 | 7.95 | .1332 | .5274 | .2107 | .0386 | .0142 | 1.9623 | .7817 | .7598 | .7669 | .5760 | .6427 | 1.5047 | .8130 |
| 90 | 4.43 | 5.54 | 4.21 | 8.92 | 7.60 | .1405 | .5421 | .2123 | .0456 | .0194 | 2.0087 | .7590 | .7342 | .7375 | .5686 | .6620 | 1.5294 | .8104 |
| 95 | 4.64 | 5.56 | 4.21 | 5.71 | 7.41 | .1410 | .5422 | .2261 | .0448 | .0195 | 1.9640 | .7324 | .7058 | .7169 | .5616 | .6261 | 1.5532 | .8162 |

STA-1 STA-2
---LOCAL---

Stator

TO/TO PO/PO EFF-AD EFF-P
INLET INLET INLET LBM/SEC
1.2439 1.9496 86.06 87.32

8.0 9.0

| %SPAN | DIA-1 | DIA-2 | V-1 | V-2 | VM-1 | VM-2 | VO-1 | VO-2 | B-1 | B-2 | B*-1 | B*-2 | V*-1 | V*-2 | VO*-1 | VO*-2 | U-1 | U-2 |
|-------|--------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|---------|--------|--------|
| 5 | 20.409 | 21.489 | 1008.6 | 704.1 | 496.2 | 704.1 | 729.7 | 4.1 | 46.35 | .34 | 20.31 | 55.79 | 742.4 | 1252.3 | -257.7 | -1035.5 | 987.4 | 1039.7 |
| 10 | 21.009 | 21.961 | 957.1 | 673.4 | 461.5 | 673.1 | 691.7 | -18.3 | 46.27 | -1.57 | 26.14 | 58.08 | 737.0 | 1273.4 | -324.7 | -1080.8 | 1016.4 | 1062.5 |
| 15 | 21.589 | 22.432 | 924.8 | 649.6 | 449.2 | 649.1 | 658.6 | -24.5 | 45.41 | -2.16 | 30.72 | 59.68 | 755.3 | 1285.7 | -385.9 | -1109.8 | 1044.5 | 1085.3 |
| 30 | 23.314 | 23.902 | 898.9 | 645.7 | 460.2 | 645.7 | 610.0 | 7.1 | 42.74 | .63 | 38.11 | 60.67 | 839.2 | 1318.3 | -518.0 | -1149.3 | 1128.0 | 1156.4 |
| 50 | 25.601 | 25.893 | 882.4 | 658.9 | 458.0 | 658.8 | 588.0 | 13.7 | 41.78 | 1.19 | 44.88 | 62.00 | 925.4 | 1403.3 | -650.7 | -1239.1 | 1238.6 | 1252.8 |
| 70 | 27.818 | 27.902 | 871.2 | 644.8 | 467.4 | 644.6 | 560.0 | -16.8 | 40.00 | -1.50 | 49.56 | 64.75 | 1031.1 | 1511.2 | -785.9 | -1366.8 | 1345.9 | 1349.9 |
| 85 | 29.404 | 29.382 | 895.0 | 655.5 | 450.0 | 654.2 | 615.3 | 40.1 | 43.43 | 3.50 | 51.17 | 64.66 | 1036.7 | 1528.6 | -807.5 | -1381.5 | 1422.8 | 1421.6 |
| 90 | 29.914 | 29.856 | 931.1 | 664.9 | 465.5 | 660.6 | 651.2 | 74.7 | 44.38 | 6.44 | 50.11 | 64.25 | 1037.7 | 1520.8 | -796.1 | -1369.8 | 1447.3 | 1444.5 |
| 95 | 30.382 | 30.293 | 900.4 | 642.7 | 434.9 | 636.9 | 638.5 | 85.9 | 45.16 | 7.68 | 52.63 | 65.22 | 1046.1 | 1519.6 | -831.4 | -1379.7 | 1465.9 | 1465.6 |

| %SPAN | INCS | INCM | DEV | TURN | CAMBER | OMEGA-B | D-FAC | OMEGA-B | LOSS-P | LOSS-P | PO2/ | EFF-P | EFF-AD | EFF-P | M-1 | M-2 | M*-1 | M*-2 |
|-------|------|------|-------|-------|--------|---------|-------|---------|--------|--------|-------|-------|--------|-------|-------|-------|-------|--------|
| 5 | .46 | 3.38 | 12.75 | 46.01 | 45.90 | .0034 | .4761 | .1257 | .0313 | .0304 | .9507 | .0000 | .0000 | .8102 | .8599 | .5880 | .6379 | 1.0457 |
| 10 | .93 | 3.87 | 9.89 | 47.84 | 43.89 | .0048 | .4818 | .0876 | .0224 | .0211 | .9648 | .0000 | .0000 | .8748 | .8169 | .5623 | .6394 | 1.0633 |
| 15 | .92 | 3.86 | 8.70 | 47.57 | 52.35 | .0055 | .4818 | .0906 | .0211 | .0196 | .9725 | .0000 | .0000 | .8737 | .7937 | .5420 | .6552 | 1.0728 |
| 30 | .32 | 3.31 | 11.85 | 42.11 | 40.67 | .0067 | .4676 | .0924 | .0260 | .0241 | .9700 | .0000 | .0000 | .8385 | .7703 | .5385 | .7210 | 1.0995 |
| 50 | 1.12 | 4.25 | 13.21 | 40.60 | 49.55 | .0122 | .4515 | .0734 | .0225 | .0187 | .9771 | .0000 | .0000 | .8636 | .7511 | .5473 | .7858 | 1.1656 |
| 70 | 3.39 | 3.62 | 11.95 | 41.99 | 49.85 | .0106 | .4790 | .0812 | .0269 | .0234 | .9754 | .0000 | .0000 | .8537 | .7377 | .5331 | .8700 | 1.2493 |
| 85 | 3.86 | 7.17 | 19.40 | 39.93 | 51.99 | .0241 | .4924 | .0951 | .0332 | .0248 | .9706 | .0000 | .0000 | .8533 | .7464 | .5341 | .8661 | 1.2455 |
| 90 | 4.81 | 8.14 | 23.93 | 37.93 | 53.62 | .0289 | .5062 | .1544 | .0545 | .0443 | .9496 | .0000 | .0000 | .7625 | .7708 | .5376 | .8625 | 1.2296 |
| 95 | 5.45 | 8.82 | 27.37 | 37.48 | 56.01 | .0243 | .5080 | .1211 | .0433 | .0346 | .9627 | .0000 | .0000 | .7936 | .7478 | .5184 | .8653 | 1.2259 |

STA-1 STA-2
---LOCAL---

10.0 11.0

TABLE 10.4

BLADE-ELEMENT AND OVERALL PERFORMANCE WITH UNIFORM INLET
FREE STREAM EFFICIENCY METHOD, 100 PERCENT OF DESIGN SPEED

Rotor

| | DIA-1 | DIA-2 | V-1 | V-2 | VM-1 | VM-2 | VO-1 | VO-2 | B-1 | B-2 | B*-1 | B*-2 | V*-1 | V*-2 | VO*-1 | VO*-2 | U*-1 | U*-2 |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|--------|--------|--------|
| %SPAN | IN | IN | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | DEGREE | DEGREE | DEGREE | DEGREE | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC |
| S | 17.467 | 19.769 | 568.5 | 965.3 | 568.5 | 596.1 | .0 | 759.2 | .00 | 51.86 | 56.08 | 18.33 | 1018.8 | 628.1 | -845.4 | -197.6 | 845.4 | 956.8 |
| 10 | 18.467 | 20.408 | 582.5 | 906.8 | 582.5 | 554.1 | .0 | 716.2 | .00 | 52.17 | 56.91 | 26.02 | 1066.8 | 618.9 | -893.7 | -271.5 | 893.7 | 987.7 |
| 15 | 19.467 | 21.047 | 595.1 | 866.5 | 595.1 | 534.8 | .0 | 681.8 | .00 | 51.89 | 57.72 | 32.20 | 1114.4 | 632.0 | -942.1 | -336.8 | 942.1 | 1018.6 |
| 30 | 22.314 | 22.964 | 625.6 | 837.5 | 625.6 | 553.5 | .0 | 628.5 | .00 | 48.63 | 59.91 | 41.08 | 1248.1 | 734.6 | -1079.9 | -482.9 | 1079.9 | 1111.4 |
| 50 | 25.791 | 25.520 | 646.6 | 812.2 | 646.6 | 547.0 | .0 | 600.3 | .00 | 47.66 | 62.61 | 49.23 | 1405.8 | 838.1 | -1248.2 | -634.8 | 1248.2 | 1235.1 |
| 70 | 28.954 | 28.076 | 643.0 | 785.4 | 643.0 | 541.3 | .0 | 569.0 | .00 | 46.43 | 65.35 | 55.56 | 1541.8 | 957.6 | -1401.3 | -789.8 | 1401.3 | 1358.8 |
| 85 | 31.295 | 29.993 | 622.9 | 799.2 | 622.9 | 515.8 | .0 | 610.4 | .00 | 49.80 | 67.64 | 58.48 | 1637.7 | 986.8 | -1514.6 | -841.2 | 1514.6 | 1451.6 |
| 90 | 31.883 | 30.630 | 616.1 | 806.6 | 616.1 | 500.6 | .0 | 632.4 | .00 | 51.63 | 68.23 | 59.50 | 1661.5 | 986.5 | -1543.0 | -850.0 | 1543.0 | 1482.4 |
| 95 | 32.499 | 31.271 | 609.3 | 772.7 | 609.3 | 440.4 | .0 | 634.9 | .00 | 55.25 | 68.82 | 63.37 | 1686.8 | 982.8 | -1572.9 | -878.5 | 1572.9 | 1513.4 |

Stator

| | INCS | INCH | DEV | TURN | CAMBER | OMEGA-B | D-FAC | OMEGA-B | LOSS-P | LOSS-P | PO2/ | EFF-P | EFF-AD | EFF-P | M-1 | M-2 | M*-1 | M*-2 |
|-------|--------|--------|--------|--------|--------|---------|-------|---------|--------|---------|--------|-------|--------|--------|-------|-------|--------|-------|
| %SPAN | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | SHOCK | | | TOTAL | PROFILE | PO1 | TOTAL | STATIC | STATIC | | | | |
| S | .64 | 7.10 | 16.46 | 37.74 | 47.12 | .0146 | .5573 | .0574 | .0120 | .0087 | 2.0331 | .9473 | .9637 | .9496 | .5233 | .8307 | .9386 | .5405 |
| 10 | .87 | 7.30 | 16.34 | 30.89 | 34.94 | .0178 | .5820 | .0965 | .0197 | .0161 | 1.9618 | .9408 | .9348 | .9180 | .5374 | .7762 | .9860 | .5298 |
| 15 | 1.10 | 7.15 | 15.70 | 25.52 | 34.05 | .0218 | .5855 | .1091 | .0212 | .0167 | 1.9244 | .9292 | .9224 | .9092 | .5492 | .7393 | 1.0252 | .5392 |
| 30 | 1.89 | 6.01 | 11.37 | 18.84 | 24.22 | .0434 | .5490 | .0979 | .0138 | .0050 | 1.9510 | .9439 | .9383 | .9337 | .5777 | .7116 | 1.1502 | .6242 |
| 50 | 2.93 | 5.67 | 6.89 | 13.39 | 14.62 | .0788 | .5335 | .0913 | .0182 | .0026 | 1.9798 | .9140 | .9052 | .9053 | .5987 | .6839 | 1.2954 | .7057 |
| 70 | 3.81 | 5.70 | 4.96 | 9.80 | 9.05 | .1109 | .5020 | .1074 | .0206 | .0005 | 1.9924 | .8884 | .8770 | .8809 | .5964 | .6564 | 1.4219 | .8004 |
| 85 | 4.25 | 5.53 | 4.28 | 9.16 | 7.93 | .1333 | .5298 | .1845 | .0350 | .0100 | 2.0386 | .8131 | .7933 | .7977 | .5787 | .6588 | 1.5052 | .8134 |
| 90 | 4.37 | 5.48 | 4.34 | 8.73 | 7.60 | .1406 | .5439 | .2193 | .0411 | .0151 | 2.0577 | .7838 | .7608 | .7652 | .5707 | .6609 | 1.5306 | .8084 |
| 95 | 4.59 | 5.51 | 7.48 | 5.45 | 7.41 | .1511 | .5560 | .2555 | .0430 | .0179 | 2.0193 | .7469 | .7208 | .7323 | .5634 | .6290 | 1.5546 | .8000 |

TO/TO PO/PO EFF-AD EFF-P

INLET INLET INLET INLET

1.2485 1.9878 87.15 88.34

8.0 9.0

STA-1 STA-2

---LOCAL---

Stator

| | DIA-1 | DIA-2 | V-1 | V-2 | VM-1 | VM-2 | VO-1 | VO-2 | B-1 | B-2 | B*-1 | B*-2 | V*-1 | V*-2 | VO*-1 | VO*-2 | U*-1 | U*-2 |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|--------|--------|
| %SPAN | IN | IN | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | DEGREE | DEGREE | DEGREE | DEGREE | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC |
| S | 20.409 | 21.489 | 1004.4 | 683.9 | 484.1 | 676.3 | 735.4 | -101.7 | 47.07 | -8.55 | 20.25 | 59.36 | 729.2 | 1326.9 | -252.3 | -1141.7 | 987.7 | 1040.0 |
| 10 | 21.008 | 21.961 | 948.9 | 657.4 | 445.4 | 650.1 | 695.6 | -97.7 | 47.14 | -8.55 | 26.45 | 60.74 | 720.9 | 1330.4 | -321.1 | -1160.6 | 1016.7 | 1043.8 |
| 15 | 21.589 | 22.432 | 912.5 | 636.3 | 425.2 | 629.3 | 664.7 | -94.6 | 46.76 | -8.55 | 31.29 | 61.93 | 731.7 | 1337.5 | -380.1 | -1180.2 | 1044.8 | 1085.6 |
| 30 | 23.314 | 23.902 | 890.2 | 630.3 | 439.6 | 623.2 | 619.2 | -94.1 | 44.07 | -8.59 | 38.52 | 63.52 | 817.5 | 1397.6 | -509.1 | -1250.9 | 1128.3 | 1156.8 |
| 50 | 25.601 | 25.893 | 877.8 | 645.6 | 441.3 | 638.3 | 599.5 | -96.7 | 43.07 | -8.61 | 44.92 | 64.69 | 905.7 | 1493.2 | -639.6 | -1349.8 | 1239.0 | 1283.1 |
| 70 | 27.818 | 27.902 | 873.0 | 643.2 | 456.7 | 635.9 | 575.2 | -96.4 | 41.21 | -8.82 | 49.58 | 66.27 | 1012.9 | 1580.3 | -771.2 | -1446.7 | 1346.3 | 1350.4 |
| 85 | 29.408 | 29.382 | 911.0 | 665.3 | 461.9 | 657.8 | 625.9 | -99.5 | 43.40 | -8.80 | 50.30 | 66.62 | 1036.3 | 1657.6 | -797.3 | -1521.5 | 1423.3 | 1425.0 |
| 90 | 29.914 | 29.856 | 927.3 | 673.5 | 460.3 | 666.0 | 651.1 | -99.9 | 44.60 | -8.53 | 50.35 | 66.68 | 1034.7 | 1682.3 | -796.7 | -1544.8 | 1447.8 | 1444.9 |
| 95 | 30.382 | 30.293 | 905.1 | 655.0 | 426.0 | 648.0 | 653.7 | -90.6 | 46.24 | -7.95 | 52.53 | 67.38 | 1029.1 | 1686.5 | -816.7 | -1556.7 | 1470.4 | 1466.1 |

| | INCS | INCH | DEV | TURN | CAMBER | OMEGA-B | D-FAC | OMEGA-B | LOSS-P | LOSS-P | PO2/ | EFF-P | EFF-AD | EFF-P | M-1 | M-2 | M*-1 | M*-2 |
|-------|--------|--------|--------|--------|--------|---------|-------|---------|--------|---------|-------|-------|--------|--------|-------|-------|-------|--------|
| %SPAN | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | SHOCK | | | TOTAL | PROFILE | PO1 | TOTAL | STATIC | STATIC | | | | |
| S | 1.14 | 4.11 | 3.86 | 55.62 | 55.90 | .0045 | .5223 | .1332 | .0328 | .0317 | .9482 | .0000 | .0000 | .8072 | .8549 | .5696 | .6252 | 1.1051 |
| 10 | 1.93 | 4.86 | 2.92 | 55.69 | 53.90 | .0062 | .5170 | .0763 | .0198 | .0192 | .9722 | .0000 | .0000 | .8889 | .8081 | .5478 | .6223 | 1.1084 |
| 15 | 2.28 | 5.22 | 2.30 | 55.31 | 52.35 | .0081 | .5172 | .0542 | .0140 | .0119 | .9820 | .0000 | .0000 | .9118 | .7815 | .5298 | .6328 | 1.1137 |
| 30 | 1.64 | 4.64 | 2.63 | 52.66 | 50.67 | .0098 | .5149 | .0814 | .0226 | .0199 | .9740 | .0000 | .0000 | .8610 | .7609 | .5242 | .7006 | 1.1624 |
| 50 | 2.40 | 5.53 | 3.41 | 51.68 | 49.54 | .0168 | .5065 | .0769 | .0233 | .0182 | .9763 | .0000 | .0000 | .8639 | .7452 | .5346 | .7669 | 1.2364 |
| 70 | 1.61 | 4.84 | 4.84 | 49.83 | 49.85 | .0151 | .5179 | .0960 | .0282 | .0232 | .9739 | .0000 | .0000 | .8490 | .7370 | .5302 | .8519 | 1.3028 |
| 85 | 3.84 | 7.15 | 7.30 | 52.00 | 51.99 | .0253 | .5482 | .1166 | .0403 | .0316 | .9629 | .0000 | .0000 | .8197 | .7589 | .5415 | .8650 | 1.3492 |
| 90 | 4.96 | 8.28 | 8.99 | 53.12 | 53.66 | .0297 | .5617 | .1311 | .0461 | .0366 | .9575 | .0000 | .0000 | .7984 | .7686 | .5449 | .8601 | 1.3612 |
| 95 | 6.48 | 9.85 | 11.74 | 54.19 | 56.01 | .0307 | .5731 | .1082 | .0386 | .0277 | .9665 | .0000 | .0000 | .8137 | .7500 | .5275 | .8493 | 1.3581 |

STA-1 STA-2

---LOCAL---

10.0 11.0

BLADE-ELEMENT AND OVERALL PERFORMANCE WITH UNIFORM INLET
FREE STREAM EFFICIENCY METHOD, 100 PERCENT OF DESIGN SPEED

| DIA=1 | DIA=2 | V-I | V-2 | VM-1 | VM-2 | VO-1 | VO-2 | B-1 | B-2 | B-1 | B-2 | V-1 | V-2 | VO-1 | VO-2 | U-1 | U-2 |
|--------|--------|---------|---------|---------|---------|---------|---------|--------|--------|--------|--------|---------|---------|---------|---------|---------|---------|
| IN | IN | F T/SEC | F T/SEC | F T/SEC | F T/SEC | F T/SEC | F T/SEC | DEGREE | DEGREE | DEGREE | DEGREE | F T/SEC | F T/SEC | F T/SEC | F T/SEC | F T/SEC | F T/SEC |
| 17.487 | 19.769 | 561.6 | 977.4 | 581.6 | 601.3 | .0 | 770.6 | .00 | 52.04 | 58.40 | 17.19 | 1014.8 | 629.4 | -845.2 | -186.0 | 845.2 | 985.6 |
| 18.467 | 20.408 | 575.3 | 918.9 | 575.3 | 560.0 | .0 | 728.6 | .00 | 52.06 | 57.22 | 24.81 | 1062.8 | 617.0 | -893.6 | -258.9 | 893.6 | 985.6 |
| 19.467 | 21.047 | 587.7 | 879.7 | 587.7 | 539.2 | .0 | 695.0 | .00 | 52.19 | 58.04 | 30.95 | 1110.3 | 628.9 | -942.0 | -323.5 | 942.0 | 1018.5 |
| 22.314 | 22.964 | 616.7 | 837.3 | 616.7 | 541.5 | .0 | 618.6 | .00 | 49.70 | 60.27 | 41.09 | 1243.5 | 718.9 | -1079.8 | -472.6 | 1079.8 | 1111.2 |
| 25.791 | 25.520 | 636.4 | 821.9 | 636.4 | 541.5 | .0 | 618.6 | .00 | 48.79 | 62.98 | 48.69 | 1400.9 | 820.8 | -1248.0 | -615.6 | 1248.0 | 1234.9 |
| 28.954 | 28.076 | 632.8 | 798.1 | 632.8 | 538.1 | .0 | 589.4 | .00 | 47.60 | 65.69 | 55.01 | 1537.4 | 938.9 | -1401.1 | -767.2 | 1401.1 | 1350.6 |
| 31.283 | 30.993 | 613.5 | 813.3 | 613.5 | 507.5 | .0 | 635.4 | .00 | 51.48 | 67.94 | 58.12 | 1633.9 | 960.9 | -1514.4 | -815.9 | 1514.4 | 1451.4 |
| 31.893 | 30.630 | 606.9 | 825.3 | 606.9 | 503.2 | .0 | 654.1 | .00 | 52.43 | 68.53 | 58.72 | 1657.9 | 968.9 | -1542.8 | -828.1 | 1542.8 | 1482.2 |
| 32.489 | 31.271 | 600.2 | 791.7 | 600.2 | 444.5 | .0 | 655.1 | .00 | 55.85 | 69.11 | 62.61 | 1683.2 | 966.4 | -1572.6 | -853.1 | 1572.6 | 1513.2 |

| %SPAN | INCS DEGREE | INCM DEGREE | DEV DEGREE | TURN DEGREE | CAMBER DEGREE | 0.6GA-B SWOCK | D-FAC | 0.6GA-B LOSS-P | PO1 TOTAL | PO2/ TOTAL | LOSS-P TOTAL | LOSS-P PROFILE | EFF-P TOTAL | EFF-AD STATIC | M=1 | M=2 | M=1 | M=2 |
|-------|----------------|----------------|---------------|----------------|------------------|------------------|-------|-------------------|--------------|---------------|-----------------|-------------------|----------------|------------------|------|-------|--------|------|
| 5 | 99 | 7.42 | 15.32 | 39.21 | 47.12 | 0.154 | 5569 | 0.616 | 0.129 | 0.097 | 2.0500 | 0.9656 | 1.9619 | 0.9457 | 5167 | 8.813 | 9.347 | 5417 |
| 10 | 120 | 7.62 | 15.15 | 32.41 | 39.96 | 0.186 | 5850 | 1.033 | 0.216 | 0.177 | 1.9773 | 0.9373 | 1.9308 | 0.9112 | 5307 | 7.865 | 9.825 | 5281 |
| 15 | 143 | 7.45 | 14.44 | 27.09 | 34.04 | 0.225 | 5859 | 1.124 | 0.232 | 0.185 | 1.9409 | 0.9253 | 1.9179 | 0.9019 | 5422 | 7.503 | 1.0260 | 5364 |
| 30 | 2.24 | 6.35 | 11.37 | 19.18 | 24.21 | 0.041 | 5622 | 0.907 | 0.184 | 0.095 | 1.9461 | 0.9270 | 0.9197 | 0.9131 | 5691 | 7.103 | 1.1456 | 6098 |
| 50 | 3.79 | 6.04 | 6.35 | 14.29 | 14.62 | 0.074 | 5481 | 1.121 | 0.226 | 0.067 | 1.9912 | 0.8977 | 0.8872 | 0.8653 | 5886 | 6.907 | 1.2889 | 6897 |
| 70 | 4.17 | 6.05 | 4.41 | 10.69 | 9.04 | 0.114 | 5171 | 1.269 | 0.247 | 0.032 | 2.0110 | 0.8726 | 0.8594 | 0.8614 | 5863 | 6.655 | 1.4157 | 7829 |
| 85 | 4.55 | 5.84 | 3.90 | 9.83 | 7.92 | 0.137 | 5500 | 2.065 | 0.396 | 0.141 | 2.0616 | 0.7972 | 0.7755 | 0.7773 | 5695 | 6.562 | 1.4993 | 7895 |
| 90 | 4.67 | 5.77 | 3.55 | 9.81 | 7.59 | 0.140 | 5584 | 2.320 | 0.445 | 0.178 | 2.0903 | 0.7775 | 0.7534 | 0.7538 | 5619 | 6.747 | 1.5250 | 7922 |
| 95 | 4.88 | 5.80 | 6.71 | 6.50 | 7.41 | 0.156 | 5653 | 2.658 | 0.459 | 0.201 | 2.0522 | 0.7434 | 0.7165 | 0.7236 | 5545 | 6.432 | 1.5495 | 7851 |

| DIA-1 | DIA-2 | V-1 | V-2 | VM-1 | VM-2 | V0-1 | V0-2 | B-1 | B-2 | B-1-1 | B-1-2 | V3-1 | V3-2 | V0'-1 | V0'-2 | U-1 | U-2 |
|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|--------|--------|
| IN | IN | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | DEGREE | DEGREE | DEGREE | DEGREE | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC |
| 20.409 | 21.489 | 1014.8 | 669.2 | 687.0 | 662.7 | 746.5 | -93.1 | 47.37 | -8.00 | 19.34 | 59.68 | 728.2 | 1312.5 | -241.1 | -1133.0 | 987.6 | 1039.8 |
| 21.009 | 21.971 | 958.6 | 642.3 | 647.1 | 636.1 | 707.7 | -89.4 | 47.56 | -8.00 | 25.52 | 61.10 | 717.2 | 1316.1 | -308.9 | -1152.0 | 1016.6 | 1063.7 |
| 21.589 | 22.432 | 923.1 | 620.8 | 626.8 | 614.7 | 677.6 | -86.4 | 47.23 | -8.00 | 30.35 | 62.32 | 726.5 | 1323.4 | -367.1 | -1171.8 | 1044.7 | 1085.5 |
| 23.314 | 23.902 | 888.1 | 609.9 | 626.6 | 604.0 | 621.1 | -85.2 | 45.10 | -8.03 | 38.52 | 64.06 | 801.3 | 1380.9 | -499.1 | -1241.8 | 1125.0 | 1156.6 |
| 25.601 | 25.893 | 885.9 | 630.2 | 635.1 | 623.9 | 617.6 | -88.5 | 44.20 | -8.07 | 44.36 | 65.05 | 888.4 | 1479.4 | -621.2 | -1341.4 | 1238.8 | 1254.0 |
| 27.818 | 27.902 | 884.1 | 634.4 | 653.1 | 628.1 | 595.9 | -89.1 | 42.38 | -3.08 | 48.95 | 66.42 | 994.7 | 1570.4 | -750.2 | -1439.3 | 1346.1 | 1350.2 |
| 29.408 | 29.382 | 923.5 | 664.8 | 651.1 | 658.3 | 651.9 | -93.3 | 41.90 | -8.07 | 49.69 | 66.52 | 1011.2 | 1651.9 | -771.1 | -1515.1 | 1423.0 | 1441.8 |
| 29.914 | 29.856 | 943.9 | 672.6 | 661.5 | 666.0 | 673.4 | -94.5 | 45.51 | -8.08 | 49.49 | 66.60 | 1018.3 | 1677.1 | -774.1 | -1539.2 | 1447.5 | 1464.7 |
| 30.382 | 30.293 | 921.1 | 656.1 | 627.2 | 649.6 | 674.5 | -92.3 | 47.08 | -8.09 | 51.75 | 67.37 | 1013.2 | 1688.2 | -795.5 | -1558.2 | 1470.2 | 1465.9 |

TABLE 10.6

BLADE-ELEMENT AND OVERALL PERFORMANCE WITH UNIFORM INLET
FREE STREAM EFFICIENCY METHOD, 100 PERCENT OF DESIGN SPEED

Rotor

| %SPAN | DIA-1 | DIA-2 | V-1 | V-2 | VM-1 | VM-2 | VO-1 | VO-2 | B-1 | B-2 | B*-1 | B*-2 | FT/SEC | DEGREE | FT/SEC | DEGREE | FT/SEC | DEGREE | FT/SEC | DEGREE | FT/SEC | DEGREE | FT/SEC | DEGREE | U-1 | U-2 |
|-------|--------|--------|-------|-------|-------|-------|------|-------|-----|-------|-------|-------|--------|--------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-----|-----|
| 5 | 17.467 | 19.769 | 550.8 | 974.8 | 550.8 | 594.8 | .0 | 772.3 | .00 | 52.40 | 56.94 | 17.32 | 1009.7 | 623.0 | -846.3 | -185.4 | 846.3 | 957.8 | | | | | | | | |
| 10 | 18.467 | 20.408 | 564.2 | 919.3 | 564.2 | 558.3 | .0 | 730.4 | .00 | 52.60 | 57.76 | 24.83 | 1057.8 | 615.4 | -894.7 | -258.4 | 894.7 | 988.7 | | | | | | | | |
| 15 | 19.467 | 21.047 | 576.3 | 878.6 | 576.3 | 537.5 | .0 | 695.0 | .00 | 52.28 | 58.57 | 31.12 | 1105.3 | 628.1 | -943.1 | -324.7 | 943.1 | 1019.7 | | | | | | | | |
| 30 | 22.314 | 22.964 | 604.0 | 841.0 | 604.0 | 541.7 | .0 | 643.2 | .00 | 49.90 | 60.81 | 40.90 | 1238.4 | 716.8 | -1081.1 | -469.3 | 1081.1 | 1112.6 | | | | | | | | |
| 50 | 25.791 | 25.520 | 620.7 | 823.2 | 620.7 | 534.1 | .0 | 626.4 | .00 | 49.55 | 63.58 | 48.79 | 1395.2 | 810.9 | -1249.5 | -610.0 | 1249.5 | 1236.9 | | | | | | | | |
| 70 | 28.954 | 28.076 | 615.1 | 802.3 | 615.1 | 518.0 | .0 | 612.7 | .00 | 49.79 | 66.32 | 55.27 | 1531.7 | 909.6 | -1402.8 | -747.6 | 1402.8 | 1360.2 | | | | | | | | |
| 85 | 31.295 | 29.993 | 596.4 | 822.7 | 596.4 | 503.3 | .0 | 650.8 | .00 | 52.28 | 68.53 | 57.90 | 1629.3 | 947.2 | -1516.2 | -802.4 | 1516.2 | 1453.1 | | | | | | | | |
| 90 | 31.883 | 30.630 | 590.0 | 832.8 | 590.0 | 496.1 | .0 | 669.0 | .00 | 53.44 | 69.10 | 58.67 | 1653.5 | 954.1 | -1544.7 | -815.0 | 1544.7 | 1484.0 | | | | | | | | |
| 95 | 32.499 | 31.271 | 583.5 | 800.9 | 583.5 | 433.2 | .0 | 673.6 | .00 | 57.26 | 69.67 | 62.76 | 1679.2 | 946.5 | -1574.5 | -841.5 | 1574.5 | 1515.0 | | | | | | | | |

| %SPAN | INCS | INCM | DEV | TURN | CHAMBER | OMEGA-B | D-FAC | OMEGA-B | LOSS-P | LOSS-P | P02/ | EFF-P | EFF-AD | EFF-P | M-1 | M-2 | M*-1 | M*-2 |
|-------|------|------|-------|-------|---------|---------|-------|---------|--------|--------|--------|-------|--------|-------|-------|-------|--------|-------|
| 5 | 1.53 | 7.96 | 15.95 | 39.62 | 47.12 | .0170 | .5614 | .0642 | .0135 | .0099 | 2.0530 | .9646 | .9608 | .9437 | .5064 | .8384 | .9294 | .5358 |
| 10 | 1.74 | 8.15 | 15.18 | 32.94 | 39.97 | .0203 | .5850 | .0992 | .0207 | .0164 | 1.9863 | .9405 | .9343 | .9146 | .5200 | .7866 | .9774 | .5266 |
| 15 | 1.94 | 7.97 | 14.61 | 27.45 | 34.04 | .0241 | .5887 | .1078 | .0222 | .0172 | 1.9472 | .9289 | .9219 | .9055 | .5313 | .7492 | 1.0213 | .5356 |
| 30 | 2.80 | 6.88 | 11.15 | 19.90 | 24.18 | .0457 | .5631 | .0902 | .0184 | .0091 | 1.9581 | .9284 | .9211 | .9133 | .5572 | .7131 | 1.1420 | .6078 |
| 50 | 3.92 | 6.63 | 6.43 | 14.80 | 14.61 | .0811 | .5551 | .1237 | .0249 | .0087 | 1.9957 | .8891 | .8777 | .8738 | .5735 | .6908 | 1.2846 | .6805 |
| 70 | 4.81 | 6.68 | 4.67 | 11.06 | 9.05 | .1134 | .5395 | .1602 | .0309 | .0092 | 2.0158 | .8449 | .8288 | .8287 | .5688 | .6663 | 1.4090 | .7554 |
| 85 | 5.14 | 6.43 | 3.69 | 10.63 | 7.92 | .1357 | .5605 | .2200 | .0424 | .0165 | 2.0782 | .7884 | .7656 | .7633 | .5525 | .6745 | 1.4925 | .7766 |
| 90 | 5.24 | 6.35 | 3.51 | 10.42 | 7.59 | .1430 | .5694 | .2459 | .0472 | .0201 | 2.1048 | .7686 | .7435 | .7399 | .5452 | .6794 | 1.5186 | .7783 |
| 95 | 5.44 | 6.36 | 6.86 | 6.91 | 7.41 | .1537 | .5841 | .2829 | .0486 | .0226 | 2.0484 | .7327 | .7044 | .7075 | .5381 | .6488 | 1.5433 | .7667 |

TO/TO PO/PO EFF-AD EFF-P

INLET INLET INLET INLET

1.2607 2.0110 84.61 86.05

STA-1 STA-2

---LOCAL---

8.0 9.0

Stator

| %SPAN | DIA-1 | DIA-2 | V-1 | V-2 | VM-1 | VM-2 | VO-1 | VO-2 | B-1 | B-2 | B*-1 | B*-2 | FT/SEC | DEGREE | FT/SEC | DEGREE | FT/SEC | DEGREE | FT/SEC | DEGREE | FT/SEC | DEGREE | FT/SEC | DEGREE | U-1 | U-2 |
|-------|--------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|---------|--------|--------|--------|--------|--------|--------|--------|--------|-----|-----|
| 5 | 20.409 | 21.489 | 1010.1 | 652.5 | 678.6 | 652.5 | 748.1 | -4.1 | 47.79 | -3.6 | 19.52 | 58.02 | 720.1 | 1232.2 | -240.7 | -1045.2 | 985.8 | 1041.1 | | | | | | | | |
| 10 | 21.004 | 21.961 | 957.2 | 624.8 | 642.6 | 623.9 | 709.4 | -31.4 | 47.83 | -2.91 | 25.64 | 60.33 | 712.9 | 1260.8 | -308.4 | -1075.4 | 1017.8 | 1064.0 | | | | | | | | |
| 15 | 21.589 | 22.432 | 919.7 | 603.7 | 621.9 | 601.7 | 677.5 | -47.9 | 47.45 | -4.54 | 30.63 | 62.06 | 723.0 | 1284.4 | -368.4 | -1134.7 | 1046.0 | 1086.8 | | | | | | | | |
| 30 | 23.314 | 23.902 | 889.3 | 593.8 | 623.3 | 593.8 | 634.4 | 6.0 | 45.51 | .58 | 38.46 | 62.73 | 796.1 | 1296.1 | -495.2 | -1152.0 | 1129.5 | 1158.0 | | | | | | | | |
| 50 | 25.601 | 25.893 | 884.0 | 615.1 | 624.6 | 614.9 | 625.6 | -12.0 | 45.05 | -1.12 | 44.55 | 64.10 | 876.4 | 1407.9 | -614.8 | -1266.5 | 1240.3 | 1254.5 | | | | | | | | |
| 70 | 27.818 | 27.902 | 884.5 | 624.8 | 631.0 | 624.8 | 619.8 | 1.2 | 44.49 | .11 | 49.08 | 65.17 | 963.4 | 1488.1 | -727.9 | -1350.6 | 1347.7 | 1351.8 | | | | | | | | |
| 85 | 29.404 | 29.382 | 927.1 | 655.8 | 643.7 | 655.2 | 667.2 | 28.1 | 46.02 | 2.45 | 49.65 | 64.85 | 994.2 | 1541.6 | -757.6 | -1395.4 | 1424.8 | 1423.5 | | | | | | | | |
| 90 | 29.914 | 29.856 | 945.5 | 661.0 | 647.9 | 660.0 | 684.5 | 36.3 | 46.74 | 3.15 | 49.58 | 64.92 | 997.3 | 1557.0 | -760.7 | -1410.2 | 1449.3 | 1446.5 | | | | | | | | |
| 95 | 30.362 | 30.293 | 923.9 | 644.6 | 610.5 | 643.7 | 693.5 | 34.1 | 48.64 | 3.03 | 51.89 | 65.82 | 989.3 | 1571.5 | -778.4 | -1433.6 | 1472.0 | 1467.7 | | | | | | | | |

| %SPAN | INCS | INCM | DEV | TURN | CHAMBER | OMEGA-B | D-FAC | OMEGA-B | LOSS-P | LOSS-P | P02/ | EFF-P | EFF-AD | EFF-P | M-1 | M-2 | M*-1 | M*-2 |
|-------|------|-------|-------|-------|---------|---------|-------|---------|--------|--------|-------|-------|--------|-------|-------|-------|-------|--------|
| 5 | 1.86 | 4.79 | 12.05 | 48.15 | 55.90 | .0061 | .5344 | .1452 | .0361 | .0346 | .9432 | .0000 | .0000 | .8052 | .8600 | .5409 | .6172 | 1.0214 |
| 10 | 2.59 | 5.53 | 8.56 | 50.73 | 53.90 | .0083 | .5408 | .1004 | .0256 | .0235 | .9640 | .0000 | .0000 | .8670 | .8154 | .5180 | .6143 | 1.0453 |
| 15 | 3.02 | 5.96 | 6.30 | 51.99 | 52.34 | .0104 | .5465 | .0743 | .0194 | .0167 | .9750 | .0000 | .0000 | .8914 | .7869 | .5003 | .6225 | 1.0645 |
| 30 | 3.05 | 6.04 | 11.79 | 44.93 | 50.66 | .0146 | .5282 | .0862 | .0242 | .0201 | .9727 | .0000 | .0000 | .8716 | .7587 | .4912 | .6785 | 1.0722 |
| 50 | 4.32 | 7.45 | 10.90 | 46.16 | 49.55 | .0270 | .5240 | .0865 | .0265 | .0182 | .9732 | .0000 | .0000 | .8729 | .7477 | .5059 | .7369 | 1.1580 |
| 70 | 4.82 | 8.05 | 13.57 | 44.38 | 49.86 | .0327 | .5250 | .0856 | .0284 | .0175 | .9738 | .0000 | .0000 | .8741 | .7413 | .5104 | .8034 | 1.2155 |
| 85 | 4.50 | 9.81 | 18.35 | 43.57 | 51.99 | .0432 | .5338 | .1232 | .0430 | .0279 | .9601 | .0000 | .0000 | .8241 | .7671 | .5293 | .8240 | 1.2443 |
| 90 | 7.16 | 10.48 | 20.67 | 43.59 | 53.67 | .0454 | .5433 | .1514 | .0537 | .0376 | .9498 | .0000 | .0000 | .7795 | .7791 | .5306 | .8254 | 1.2497 |
| 95 | 8.89 | 12.25 | 22.72 | 45.61 | 56.01 | .0492 | .5601 | .1290 | .0465 | .0287 | .9591 | .0000 | .0000 | .7931 | .7615 | .5148 | .8118 | 1.2549 |

NCORR WCORR TO/TO PO/PO EFF-AD EFF-P MC1/A1

INLET INLET INLET INLET INLET LBM/SEC

RPM LBM/SEC

11104. 173.18 1.2607 1.9475 80.34 82.10 38.88

STA-1 STA-2

---LOCAL---

10.0 11.0

BLADE-ELEMENT AND OVERALL PERFORMANCE WITH UNIFORM INLET
105 PERCENT OF DESIGN SPEED

Rotor

| %SPAN | S | IN | DIA-1 | DIA-2 | V-1 | V-2 | VM-1 | VM-2 | VO-1 | VO-2 | B-1 | B-2 | B'-1 | B'-2 | V'-1 | V'-2 | VO'-1 | VO'-2 | U-1 | U-2 |
|-------|--------|--------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|---------|--------|--------|--------|--------|
| | | | | | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | DEGREE | DEGREE | DEGREE | DEGREE | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC |
| 5 | 17.467 | 19.769 | 613.3 | 1082.8 | 613.3 | 766.4 | .0 | 765.0 | .00 | 44.95 | 55.39 | 17.46 | 1079.9 | 803.5 | -888.8 | -241.0 | 888.8 | 1006.0 | | |
| 10 | 18.467 | 20.408 | 629.8 | 1017.7 | 629.8 | 717.8 | .0 | 721.4 | .00 | 45.15 | 56.17 | 23.85 | 1131.2 | 785.6 | -939.7 | -317.0 | 939.7 | 1038.5 | | |
| 15 | 19.467 | 21.047 | 644.4 | 966.3 | 644.4 | 681.6 | .0 | 684.9 | .00 | 45.13 | 56.95 | 29.49 | 1181.7 | 784.0 | -990.6 | -386.0 | 990.6 | 1071.0 | | |
| 30 | 22.314 | 22.964 | 676.4 | 920.7 | 676.4 | 678.1 | .0 | 622.6 | .00 | 42.55 | 59.21 | 38.78 | 1321.7 | 871.1 | -1135.5 | -545.9 | 1135.5 | 1168.5 | | |
| 50 | 25.771 | 25.520 | 691.1 | 864.4 | 691.1 | 663.3 | .0 | 554.2 | .00 | 39.87 | 62.22 | 48.24 | 1483.3 | 997.7 | -1312.4 | -744.4 | 1312.4 | 1298.6 | | |
| 70 | 28.954 | 28.076 | 672.9 | 770.2 | 672.9 | 594.6 | .0 | 489.5 | .00 | 39.47 | 65.45 | 57.64 | 1619.7 | 1111.8 | -1473.3 | -939.2 | 1473.3 | 1428.7 | | |
| 85 | 31.295 | 29.993 | 645.7 | 734.8 | 645.7 | 547.3 | .0 | 490.0 | .00 | 41.84 | 67.93 | 62.15 | 1718.4 | 1172.0 | -1592.5 | -1036.2 | 1592.5 | 1526.2 | | |
| 90 | 31.883 | 30.630 | 638.7 | 717.2 | 638.7 | 512.4 | .0 | 501.6 | .00 | 44.40 | 68.51 | 64.14 | 1743.6 | 1174.7 | -1622.4 | -1057.1 | 1622.4 | 1558.6 | | |
| 95 | 32.499 | 31.271 | 633.3 | 685.7 | 633.3 | 462.0 | .0 | 506.7 | .00 | 47.64 | 69.04 | 66.93 | 1770.9 | 1178.8 | -1653.7 | -1084.5 | 1653.7 | 1591.2 | | |

| %SPAN | S | IN | DIA-1 | DIA-2 | V-1 | V-2 | VM-1 | VM-2 | VO-1 | VO-2 | B-1 | B-2 | B'-1 | B'-2 | V'-1 | V'-2 | VO'-1 | VO'-2 | U-1 | U-2 |
|-------|--------|--------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|---------|--------|--------|--------|--------|
| | | | | | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | DEGREE | DEGREE | DEGREE | DEGREE | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC |
| 5 | 17.467 | 19.769 | 613.3 | 1082.8 | 613.3 | 766.4 | .0 | 765.0 | .00 | 44.95 | 55.39 | 17.46 | 1079.9 | 803.5 | -888.8 | -241.0 | 888.8 | 1006.0 | | |
| 10 | 18.467 | 20.408 | 629.8 | 1017.7 | 629.8 | 717.8 | .0 | 721.4 | .00 | 45.15 | 56.17 | 23.85 | 1131.2 | 785.6 | -939.7 | -317.0 | 939.7 | 1038.5 | | |
| 15 | 19.467 | 21.047 | 644.4 | 966.3 | 644.4 | 681.6 | .0 | 684.9 | .00 | 45.13 | 56.95 | 29.49 | 1181.7 | 784.0 | -990.6 | -386.0 | 990.6 | 1071.0 | | |
| 30 | 22.314 | 22.964 | 676.4 | 920.7 | 676.4 | 678.1 | .0 | 622.6 | .00 | 42.55 | 59.21 | 38.78 | 1321.7 | 871.1 | -1135.5 | -545.9 | 1135.5 | 1168.5 | | |
| 50 | 25.771 | 25.520 | 691.1 | 864.4 | 691.1 | 663.3 | .0 | 554.2 | .00 | 39.87 | 62.22 | 48.24 | 1483.3 | 997.7 | -1312.4 | -744.4 | 1312.4 | 1298.6 | | |
| 70 | 28.954 | 28.076 | 672.9 | 770.2 | 672.9 | 594.6 | .0 | 489.5 | .00 | 39.47 | 65.45 | 57.64 | 1619.7 | 1111.8 | -1473.3 | -939.2 | 1473.3 | 1428.7 | | |
| 85 | 31.295 | 29.993 | 645.7 | 734.8 | 645.7 | 547.3 | .0 | 490.0 | .00 | 41.84 | 67.93 | 62.15 | 1718.4 | 1172.0 | -1592.5 | -1036.2 | 1592.5 | 1526.2 | | |
| 90 | 31.883 | 30.630 | 638.7 | 717.2 | 638.7 | 512.4 | .0 | 501.6 | .00 | 44.40 | 68.51 | 64.14 | 1743.6 | 1174.7 | -1622.4 | -1057.1 | 1622.4 | 1558.6 | | |
| 95 | 32.499 | 31.271 | 633.3 | 685.7 | 633.3 | 462.0 | .0 | 506.7 | .00 | 47.64 | 69.04 | 66.93 | 1770.9 | 1178.8 | -1653.7 | -1084.5 | 1653.7 | 1591.2 | | |

TO/TO PO/PO EFF-AD EFF-P
INLET INLET INLET

1.2350 1.8048 76.13 79.86

STA-1 STA-2
---LOCAL---

8.0 9.0

Stator

| %SPAN | S | IN | DIA-1 | DIA-2 | V-1 | V-2 | VM-1 | VM-2 | VO-1 | VO-2 | B-1 | B-2 | B'-1 | B'-2 | V'-1 | V'-2 | VO'-1 | VO'-2 | U-1 | U-2 |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|---------|--------|--------|--------|--------|
| | | | | | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | DEGREE | DEGREE | DEGREE | DEGREE | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC |
| 5 | 20.409 | 21.489 | 1156.5 | 1009.5 | 867.8 | 996.1 | 741.2 | -143.8 | 39.86 | -9.34 | 18.52 | 51.61 | 936.3 | 1504.0 | -297.3 | -1257.2 | 1038.5 | 1093.5 | | |
| 10 | 21.008 | 21.961 | 1074.7 | 976.5 | 840.4 | 964.3 | 701.5 | -154.0 | 39.86 | -9.07 | 23.63 | 52.83 | 917.8 | 1595.9 | -367.5 | -1271.5 | 1069.0 | 1117.5 | | |
| 15 | 21.589 | 22.432 | 1045.8 | 947.7 | 804.8 | 938.1 | 667.8 | -147.8 | 39.86 | -8.95 | 28.14 | 53.96 | 913.3 | 1594.6 | -430.7 | -1289.3 | 1098.6 | 1141.5 | | |
| 30 | 23.314 | 23.902 | 1005.2 | 915.9 | 796.5 | 905.0 | 613.2 | -140.7 | 37.59 | -8.84 | 35.71 | 56.30 | 981.6 | 1631.2 | -573.1 | -1357.0 | 1186.3 | 1216.3 | | |
| 50 | 25.601 | 25.893 | 960.1 | 865.1 | 785.1 | 855.3 | 552.6 | -124.7 | 35.14 | -8.63 | 43.86 | 59.41 | 1086.4 | 1681.4 | -750.1 | -1447.3 | 1302.7 | 1317.6 | | |
| 70 | 27.818 | 27.902 | 891.4 | 779.4 | 742.3 | 767.6 | 493.5 | -134.7 | 33.62 | -7.95 | 51.15 | 63.72 | 1183.8 | 1733.8 | -922.0 | -1554.6 | 1415.5 | 1419.8 | | |
| 85 | 29.408 | 29.382 | 883.2 | 735.8 | 728.3 | 730.5 | 499.6 | -87.7 | 34.45 | -6.86 | 53.85 | 65.23 | 1234.6 | 1743.4 | -996.8 | -1583.0 | 1496.4 | 1495.1 | | |
| 90 | 29.914 | 29.856 | 877.7 | 725.4 | 711.3 | 721.2 | 514.1 | -78.1 | 35.86 | -6.18 | 54.79 | 65.70 | 1233.8 | 1752.6 | -1008.1 | -1597.3 | 1522.2 | 1519.2 | | |
| 95 | 30.382 | 30.293 | 861.3 | 705.3 | 685.3 | 698.7 | 521.7 | -78.2 | 37.28 | -7.82 | 56.22 | 65.89 | 1232.5 | 1780.3 | -1024.3 | -1637.5 | 1546.0 | 1541.5 | | |

| %SPAN | S | IN | DIA-1 | DIA-2 | V-1 | V-2 | VM-1 | VM-2 | VO-1 | VO-2 | B-1 | B-2 | B'-1 | B'-2 | V'-1 | V'-2 | VO'-1 | VO'-2 | U-1 | U-2 |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|---------|--------|--------|--------|--------|
| | | | | | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | DEGREE | DEGREE | DEGREE | DEGREE | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC |
| 5 | 20.409 | 21.489 | 1156.5 | 1009.5 | 867.8 | 996.1 | 741.2 | -143.8 | 39.86 | -9.34 | 18.52 | 51.61 | 936.3 | 1504.0 | -297.3 | -1257.2 | 1038.5 | 1093.5 | | |
| 10 | 21.008 | 21.961 | 1074.7 | 976.5 | 840.4 | 964.3 | 701.5 | -154.0 | 39.86 | -9.07 | 23.63 | 52.83 | 917.8 | 1595.9 | -367.5 | -1271.5 | 1069.0 | 1117.5 | | |
| 15 | 21.589 | 22.432 | 1045.8 | 947.7 | 804.8 | 938.1 | 667.8 | -147.8 | 39.86 | -8.95 | 28.14 | 53.96 | 913.3 | 1594.6 | -430.7 | -1289.3 | 1098.6 | 1141.5 | | |
| 30 | 23.314 | 23.902 | 1005.2 | 915.9 | 796.5 | 905.0 | 613.2 | -140.7 | 37.59 | -8.84 | 35.71 | 56.30 | 981.6 | 1631.2 | -573.1 | -1357.0 | 1186.3 | 1216.3 | | |
| 50 | 25.601 | 25.893 | 960.1 | 865.1 | 785.1 | 855.3 | 552.6 | -124.7 | 35.14 | -8.63 | 43.86 | 59.41 | 1086.4 | 1681.4 | -750.1 | -1447.3 | 1302.7 | 1317.6 | | |
| 70 | 27.818 | 27.902 | 891.4 | 779.4 | 742.3 | 767.6 | 493.5 | -134.7 | 33.62 | -7.95 | 51.15 | 63.72 | 1183.8 | 1733.8 | -922.0 | -1554.6 | 1415.5 | 1419.8 | | |
| 85 | 29.408 | 29.382 | 883.2 | 735.8 | 728.3 | 730.5 | 499.6 | -87.7 | 34.45 | -6.86 | 53.85 | 65.23 | 1234.6 | 1743.4 | -996.8 | -1583.0 | 1496.4 | 1495.1 | | |
| 90 | 29.914 | 29.856 | 877.7 | 725.4 | 711.3 | 721.2 | 514.1 | -78.1 | 35.86 | -6.18 | 54.79 | 65.70 | 1233.8 | 1752.6 | -1008.1 | -1597.3 | 1522.2 | 1519.2 | | |
| 95 | 30.382 | 30.293 | 861.3 | 705.3 | 685.3 | 698.7 | 521.7 | -78.2 | 37.28 | -7.82 | 56.22 | 65.89 | 1232.5 | 1780.3 | -1024.3 | -1637.5 | 1546.0 | 1541.5 | | |

NCORR WCORR TO/TO PO/PO EFF-AD EFF-P MC1/A1
INLET INLET INLET INLET LBM/SEC
RPM LBM/SEC S S S
11662. 184.86 1.2350 1.7080 70.25 72.41 41.50

STA-1 STA-2
---LOCAL---
10.0 11.0

TABLE 11.2

BLADE-ELEMENT AND OVERALL PERFORMANCE WITH UNIFORM INLET
105 PERCENT OF DESIGN SPEED

Rotor

| | DIA-1 | DIA-2 | V-1 | V-2 | VM-1 | VM-2 | VO-1 | VO-2 | B-1 | B-2 | B1-1 | B1-2 | V*-1 | V*-2 | VO*-1 | VO*-2 | U-1 | U-2 |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|---------|--------|--------|
| | IN | IN | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | DEGREE | DEGREE | DEGREE | DEGREE | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC |
| %SPAN | | | | | | | | | | | | | | | | | | |
| 5 | 17.467 | 19.769 | 613.5 | 1073.1 | 613.5 | 756.7 | 0 | 760.8 | 0 | 45.16 | 55.35 | 17.84 | 1079.0 | 795.1 | -887.6 | -243.7 | 887.6 | 1004.6 |
| 10 | 18.467 | 20.408 | 629.9 | 1015.0 | 629.9 | 716.7 | 0 | 718.7 | 0 | 45.09 | 56.13 | 23.97 | 1130.3 | 785.0 | -938.4 | -318.3 | 938.4 | 1037.1 |
| 15 | 19.467 | 21.047 | 644.6 | 965.7 | 644.6 | 682.6 | 0 | 683.1 | 0 | 45.01 | 56.91 | 29.48 | 1180.7 | 785.0 | -989.2 | -386.4 | 989.2 | 1063.5 |
| 20 | 20.467 | 21.686 | 659.3 | 916.4 | 659.3 | 644.6 | 0 | 644.6 | 0 | 44.93 | 57.64 | 35.48 | 1230.7 | 785.0 | -1040.0 | -454.8 | 1040.0 | 1089.9 |
| 25 | 21.467 | 22.325 | 674.0 | 867.1 | 674.0 | 604.1 | 0 | 604.1 | 0 | 44.85 | 58.37 | 41.48 | 1280.7 | 785.0 | -1090.8 | -521.2 | 1090.8 | 1116.3 |
| 30 | 22.467 | 22.964 | 688.7 | 817.8 | 688.7 | 563.6 | 0 | 563.6 | 0 | 44.77 | 59.10 | 47.48 | 1330.7 | 785.0 | -1141.6 | -587.6 | 1141.6 | 1142.7 |
| 35 | 23.467 | 23.603 | 703.4 | 768.5 | 703.4 | 523.1 | 0 | 523.1 | 0 | 44.69 | 59.83 | 53.48 | 1380.7 | 785.0 | -1192.4 | -654.0 | 1192.4 | 1169.1 |
| 40 | 24.467 | 24.242 | 718.1 | 719.2 | 718.1 | 482.6 | 0 | 482.6 | 0 | 44.61 | 60.56 | 59.48 | 1430.7 | 785.0 | -1243.2 | -720.4 | 1243.2 | 1195.5 |
| 45 | 25.467 | 24.881 | 732.8 | 670.3 | 732.8 | 442.1 | 0 | 442.1 | 0 | 44.53 | 61.29 | 65.48 | 1480.7 | 785.0 | -1294.0 | -786.8 | 1294.0 | 1221.9 |
| 50 | 26.467 | 25.520 | 747.5 | 621.4 | 747.5 | 401.6 | 0 | 401.6 | 0 | 44.45 | 62.02 | 71.48 | 1530.7 | 785.0 | -1344.8 | -853.2 | 1344.8 | 1248.3 |
| 55 | 27.467 | 26.159 | 762.2 | 572.5 | 762.2 | 361.1 | 0 | 361.1 | 0 | 44.37 | 62.75 | 77.48 | 1580.7 | 785.0 | -1395.6 | -919.6 | 1395.6 | 1274.7 |
| 60 | 28.467 | 26.798 | 776.9 | 523.6 | 776.9 | 320.6 | 0 | 320.6 | 0 | 44.29 | 63.48 | 83.48 | 1630.7 | 785.0 | -1446.4 | -986.0 | 1446.4 | 1301.1 |
| 65 | 29.467 | 27.437 | 791.6 | 474.7 | 791.6 | 280.1 | 0 | 280.1 | 0 | 44.21 | 64.21 | 89.48 | 1680.7 | 785.0 | -1497.2 | -1052.4 | 1497.2 | 1327.5 |
| 70 | 30.467 | 28.076 | 806.3 | 425.8 | 806.3 | 239.6 | 0 | 239.6 | 0 | 44.13 | 64.94 | 95.48 | 1730.7 | 785.0 | -1548.0 | -1118.8 | 1548.0 | 1353.9 |
| 75 | 31.467 | 28.715 | 821.0 | 376.9 | 821.0 | 199.1 | 0 | 199.1 | 0 | 44.05 | 65.67 | 101.48 | 1780.7 | 785.0 | -1598.8 | -1185.2 | 1598.8 | 1380.3 |
| 80 | 32.467 | 29.354 | 835.7 | 328.0 | 835.7 | 158.6 | 0 | 158.6 | 0 | 43.97 | 66.40 | 107.48 | 1830.7 | 785.0 | -1649.6 | -1251.6 | 1649.6 | 1406.7 |
| 85 | 33.467 | 30.000 | 850.4 | 279.1 | 850.4 | 118.1 | 0 | 118.1 | 0 | 43.89 | 67.13 | 113.48 | 1880.7 | 785.0 | -1700.4 | -1318.0 | 1700.4 | 1433.1 |
| 90 | 34.467 | 30.630 | 865.1 | 230.2 | 865.1 | 77.6 | 0 | 77.6 | 0 | 43.81 | 67.86 | 119.48 | 1930.7 | 785.0 | -1751.2 | -1384.4 | 1751.2 | 1459.5 |
| 95 | 35.467 | 31.271 | 879.8 | 181.3 | 879.8 | 37.1 | 0 | 37.1 | 0 | 43.73 | 68.59 | 125.48 | 1980.7 | 785.0 | -1802.0 | -1450.8 | 1802.0 | 1485.9 |

| | INCS | INCM | DEV | TURN | CAMBER | OMEGA-B | D-FAC | OMEGA-B | LOSS-P | PO2 | PO1 | EFF-P | EFF-AD | EFF-T | M*-1 | M*-2 | M*-1 | M*-2 |
|-------|--------|--------|--------|--------|--------|---------|-------|---------|--------|--------|--------|--------|--------|--------|------|------|--------|--------|
| | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | | | | |
| %SPAN | | | | | | | | | | | | | | | | | | |
| 5 | 0.05 | 6.38 | 15.99 | 37.49 | 47.12 | 0.170 | 4.276 | 1.021 | 0.213 | 0.178 | 2.0594 | 0.907 | 0.9343 | 0.8943 | 5692 | 9334 | 1.0042 | 0.6916 |
| 10 | 0.14 | 6.48 | 14.26 | 32.16 | 39.91 | 0.222 | 4.591 | 1.500 | 0.315 | 0.268 | 1.9710 | 0.939 | 0.8941 | 0.8501 | 5872 | 8775 | 1.0600 | 0.6786 |
| 15 | 0.39 | 6.17 | 12.96 | 27.43 | 34.01 | 0.297 | 4.796 | 1.806 | 0.378 | 0.315 | 1.9019 | 0.8720 | 0.8599 | 0.8213 | 6016 | 8307 | 1.1101 | 0.672 |
| 20 | 1.30 | 5.25 | 8.92 | 20.52 | 24.20 | 0.597 | 4.640 | 1.561 | 0.329 | 0.201 | 1.8813 | 0.8660 | 0.8537 | 0.8334 | 6321 | 7899 | 1.2436 | 0.7507 |
| 25 | 2.74 | 5.33 | 5.96 | 13.98 | 14.68 | 1.041 | 4.401 | 1.663 | 0.338 | 0.122 | 1.8424 | 0.8278 | 0.8128 | 0.8066 | 6430 | 7344 | 1.3942 | 0.8479 |
| 30 | 4.08 | 5.83 | 7.22 | 7.79 | 9.19 | 1.436 | 4.123 | 2.018 | 0.365 | 0.101 | 1.7005 | 0.7536 | 0.7345 | 0.7467 | 6219 | 6485 | 1.5141 | 0.9384 |
| 35 | 4.58 | 5.80 | 8.20 | 5.66 | 8.06 | 1.693 | 4.195 | 2.583 | 0.334 | 0.150 | 1.6561 | 0.6715 | 0.6473 | 0.6668 | 5977 | 6106 | 1.5904 | 0.9756 |
| 40 | 4.69 | 5.75 | 9.13 | 4.31 | 7.70 | 1.773 | 4.316 | 2.959 | 0.474 | 0.188 | 1.6378 | 0.6293 | 0.6028 | 0.6284 | 5906 | 5934 | 1.6139 | 0.976 |
| 45 | 4.84 | 5.74 | 10.95 | 2.24 | 7.48 | 1.888 | 4.389 | 3.253 | 0.481 | 0.202 | 1.6093 | 0.5919 | 0.5638 | 0.5993 | 5856 | 5662 | 1.6367 | 0.9712 |

STA-1 STA-2
---LOCAL---

8.0 9.0

Stator

| | DIA-1 | DIA-2 | V-1 | V-2 | VM-1 | VM-2 | VO-1 | VO-2 | B-1 | B-2 | B1-1 | B1-2 | V*-1 | V*-2 | VO*-1 | VO*-2 | U-1 | U-2 |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|----------|--------|--------|
| | IN | IN | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | DEGREE | DEGREE | DEGREE | DEGREE | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC |
| %SPAN | | | | | | | | | | | | | | | | | | |
| 5 | 20.409 | 21.489 | 1147.0 | 1009.9 | 878.7 | 995.9 | 737.2 | 167.4 | 40.00 | -9.54 | 18.84 | 51.66 | 928.5 | 1605.6 | -299.9 | 9-1259.4 | 1037.1 | 1092.0 |
| 10 | 21.008 | 21.961 | 1091.9 | 984.2 | 839.0 | 971.8 | 698.8 | 155.7 | 39.79 | -9.10 | 23.74 | 52.61 | 917.0 | 1600.5 | -368.7 | 7-1271.7 | 1057.5 | 1116.0 |
| 15 | 21.559 | 22.432 | 1045.3 | 961.7 | 805.6 | 950.5 | 668.0 | 146.6 | 39.58 | -8.76 | 28.13 | 53.54 | 914.1 | 1599.6 | -431.0 | 0-1286.5 | 1097.1 | 1139.9 |
| 20 | 23.314 | 23.902 | 1007.1 | 928.2 | 801.5 | 918.2 | 609.8 | 136.3 | 37.26 | -8.44 | 35.63 | 55.79 | 986.8 | 1633.5 | -575.0 | 0-1350.9 | 1184.7 | 1214.6 |
| 25 | 25.651 | 25.893 | 959.7 | 875.8 | 785.4 | 866.4 | 551.6 | 128.2 | 35.08 | -8.42 | 43.62 | 59.03 | 1086.1 | 1684.2 | -749.3 | 1-1443.9 | 1300.9 | 1315.8 |
| 30 | 27.818 | 27.902 | 890.4 | 788.0 | 742.9 | 777.7 | 490.8 | 127.0 | 33.45 | -9.27 | 51.15 | 63.28 | 1184.8 | 1729.6 | -922.8 | 1-1544.8 | 1413.6 | 1417.9 |
| 35 | 29.408 | 29.382 | 881.1 | 744.0 | 726.3 | 738.5 | 498.8 | 89.4 | 34.48 | -6.90 | 53.89 | 64.98 | 1232.4 | 1746.4 | -995.6 | 1-1582.5 | 1494.4 | 1493.1 |
| 40 | 29.914 | 29.856 | 876.8 | 739.1 | 709.6 | 735.6 | 515.0 | 72.1 | 35.87 | -5.60 | 54.78 | 65.16 | 1230.5 | 1751.2 | -1005.2 | 1-1589.2 | 1520.1 | 1517.2 |
| 45 | 30.332 | 30.293 | 862.2 | 717.1 | 687.0 | 712.3 | 521.0 | 82.5 | 37.18 | -6.61 | 56.11 | 66.29 | 1232.1 | 1771.4 | -1022.9 | 1-1621.8 | 1543.9 | 1539.4 |

STA-1 STA-2
---LOCAL---

10.0 11.0

BLADE-ELEMENT AND OVERALL PERFORMANCE WITH UNIFORM INLET 105 PERCENT OF DESIGN SPEED

Rotor

| %SPAN | DIA-1 | DIA-2 | V-1 | V-2 | VM-1 | VM-2 | VO-1 | VO-2 | B-1 | B-2 | B1-1 | B1-2 | V1-1 | V1-2 | VO1-1 | VO1-2 | U-1 | U-2 |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | IN | IN | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | DEGREE | DEGREE | DEGREE | DEGREE | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC |
| 5 | 17.467 | 19.769 | 611.9 | 1065.0 | 011.9 | 730.3 | 0 | 775.1 | 00 | 46.71 | 55.48 | 17.62 | 1079.9 | 766.3 | 889.8 | 231.9 | 889.8 | 1001.1 |
| 10 | 18.467 | 20.408 | 628.2 | 1010.6 | 028.2 | 699.0 | 0 | 729.9 | 00 | 46.24 | 56.27 | 23.91 | 1131.2 | 765.3 | 940.7 | 309.7 | 940.7 | 1033.6 |
| 15 | 19.467 | 21.047 | 643.0 | 960.5 | 043.0 | 669.0 | 0 | 689.1 | 00 | 45.84 | 57.04 | 29.75 | 1191.9 | 771.4 | 991.7 | 383.1 | 991.7 | 1073.2 |
| 30 | 22.314 | 22.764 | 676.8 | 929.5 | 076.8 | 684.9 | 0 | 628.4 | 00 | 42.53 | 59.23 | 38.28 | 1323.0 | 873.6 | 1136.7 | 541.4 | 1136.7 | 1163.8 |
| 50 | 25.791 | 25.520 | 691.4 | 861.4 | 106.4 | 646.6 | 0 | 569.7 | 00 | 41.38 | 62.24 | 48.42 | 1484.7 | 976.3 | 1213.8 | 730.3 | 1213.8 | 1300.0 |
| 70 | 28.954 | 28.076 | 671.8 | 775.9 | 131.8 | 586.6 | 0 | 507.6 | 00 | 40.89 | 65.51 | 57.53 | 1620.8 | 1093.3 | 1474.9 | 922.4 | 1474.9 | 1430.2 |
| 85 | 31.295 | 29.993 | 643.4 | 747.2 | 163.4 | 527.4 | 0 | 528.7 | 00 | 45.10 | 68.02 | 62.18 | 1719.1 | 1130.0 | 1594.2 | 999.1 | 1594.2 | 1523.9 |
| 90 | 31.883 | 30.630 | 636.6 | 725.6 | 193.6 | 478.9 | 0 | 544.9 | 00 | 48.71 | 68.60 | 64.75 | 1744.4 | 1122.7 | 1624.1 | 1015.5 | 1624.1 | 1560.3 |
| 95 | 32.499 | 31.271 | 631.9 | 692.3 | 231.9 | 425.5 | 0 | 546.1 | 00 | 52.08 | 69.11 | 67.88 | 1772.0 | 1130.0 | 1655.5 | 1046.8 | 1655.5 | 1593.0 |

%SPAN

| | INCS | INCM | DEV | TURN | CAMBER | OMEGA-B | D-FAC | OMEGA-B | LOSS-P | PO2/ | EFF-P | EFF-AD | EFF-P | M-1 | M-2 | M1-1 | M1-2 |
|----|--------|--------|--------|--------|--------|---------|-------|---------|---------|-------|--------|--------|--------|--------|--------|--------|--------|
| | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | SHOCK | | | PROFILE | POI | TOTAL | STATIC | | | | | |
| 5 | 0.9 | 6.52 | 15.75 | 37.86 | 47.12 | 0.176 | 4.578 | 1102 | 0.231 | 0.194 | 2.0822 | 0.9371 | 0.304 | 0.890 | 0.5673 | 0.9229 | 1.0040 |
| 10 | 0.27 | 6.62 | 14.23 | 32.36 | 39.93 | 0.229 | 4.792 | 1387 | 0.292 | 0.243 | 2.0058 | 0.9125 | 0.7034 | 0.8662 | 0.5851 | 0.8114 | 1.0545 |
| 15 | 0.50 | 6.31 | 13.23 | 27.29 | 34.01 | 0.305 | 4.929 | 1589 | 0.332 | 0.267 | 1.9381 | 0.8866 | 0.8777 | 0.8467 | 0.5999 | 0.8245 | 1.1099 |
| 30 | 1.37 | 5.31 | 8.56 | 20.94 | 24.19 | 0.608 | 4.694 | 1222 | 0.359 | 0.128 | 1.8442 | 0.8969 | 0.8667 | 0.8712 | 0.6222 | 0.7950 | 1.2466 |
| 50 | 2.82 | 5.40 | 6.18 | 13.82 | 14.67 | 1.056 | 4.588 | 1591 | 0.322 | 0.103 | 1.8711 | 0.8977 | 0.8251 | 0.8217 | 0.6429 | 0.7301 | 1.3990 |
| 70 | 4.17 | 5.91 | 7.11 | 7.98 | 9.20 | 1.455 | 4.296 | 1936 | 0.351 | 0.082 | 1.7629 | 0.7729 | 0.7541 | 0.7657 | 0.6207 | 0.6521 | 1.5190 |
| 85 | 4.69 | 5.90 | 8.15 | 5.84 | 8.08 | 1.712 | 4.514 | 2713 | 0.457 | 0.166 | 1.7257 | 0.6760 | 0.5003 | 0.6685 | 0.5954 | 0.6191 | 1.5956 |
| 90 | 4.80 | 5.85 | 9.74 | 3.84 | 7.74 | 1.794 | 4.689 | 3156 | 0.495 | 0.208 | 1.7003 | 0.6285 | 0.5998 | 0.6261 | 0.5886 | 0.5965 | 1.6190 |
| 95 | 4.91 | 5.80 | 12.07 | 1.23 | 7.49 | 1.909 | 4.756 | 3437 | 0.485 | 0.215 | 1.6671 | 0.5930 | 0.5628 | 0.5997 | 0.5848 | 0.5659 | 1.6412 |

TO/TO PO/PO EFF-AD EFF-P
INLET INLET INLET INLET

STA-1 STA-2
---LOCAL---

1.2426 1.8561 79.58 81.26

8.0 9.0

Stator

%SPAN

| | DIA-1 | DIA-2 | V-1 | V-2 | VM-1 | VM-2 | VO-1 | VO-2 | B-1 | B-2 | B1-1 | B1-2 | V1-1 | V1-2 | VO1-1 | VO1-2 | U-1 | U-2 |
|----|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|--------|--------|
| | IN | IN | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | DEGREE | DEGREE | DEGREE | DEGREE | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC |
| 5 | 20.409 | 21.489 | 1132.7 | 896.9 | 048.1 | 896.4 | 750.8 | -30.9 | 41.52 | -1.98 | 18.81 | 51.47 | 896.0 | 1438.9 | -288.8 | -1125.6 | 1039.7 | 1039.7 |
| 10 | 21.008 | 21.961 | 1081.3 | 866.4 | 015.9 | 865.1 | 709.6 | -46.7 | 41.01 | -3.10 | 23.85 | 53.41 | 892.6 | 1451.5 | -360.6 | -1165.4 | 1070.2 | 1118.7 |
| 15 | 21.589 | 22.432 | 1033.9 | 844.1 | 085.8 | 842.4 | 671.8 | -53.0 | 40.52 | -3.60 | 25.55 | 54.63 | 895.2 | 1462.7 | -427.9 | -1195.7 | 1099.8 | 1142.7 |
| 30 | 23.314 | 23.902 | 1006.1 | 827.6 | 179.3 | 826.9 | 619.9 | -39.4 | 37.96 | -2.73 | 35.61 | 56.66 | 976.6 | 1504.7 | -568.8 | -1257.0 | 1187.6 | 1217.6 |
| 50 | 25.601 | 25.893 | 948.7 | 782.8 | 259.8 | 781.6 | 568.0 | -42.4 | 36.77 | -3.12 | 40.05 | 60.13 | 1058.5 | 1570.2 | -736.1 | -1361.5 | 1304.1 | 1319.0 |
| 70 | 27.818 | 27.902 | 882.6 | 693.7 | 319.1 | 691.8 | 511.7 | -50.2 | 35.43 | -4.4 | 51.53 | 64.92 | 1156.3 | 1624.2 | -905.1 | -1471.6 | 1417.1 | 1421.4 |
| 85 | 29.408 | 29.382 | 877.2 | 636.9 | 392.8 | 636.8 | 537.8 | -6.1 | 37.82 | -5.54 | 54.20 | 67.04 | 1184.1 | 1632.3 | -960.3 | -1502.9 | 1498.1 | 1498.1 |
| 90 | 29.914 | 29.056 | 867.4 | 613.5 | 464.3 | 613.5 | 597.7 | 2.0 | 40.02 | -1.9 | 55.49 | 68.00 | 1172.6 | 1638.2 | -966.2 | -1518.9 | 1523.8 | 1520.9 |
| 95 | 30.332 | 30.293 | 846.9 | 580.0 | 533.4 | 579.9 | 563.1 | -12.1 | 41.59 | -1.20 | 57.27 | 69.55 | 1171.6 | 1655.9 | -985.0 | -1555.3 | 1547.7 | 1543.2 |

%SPAN

| | INCS | INCM | DEV | TURN | CAMBER | OMEGA-B | D-FAC | OMEGA-B | LOSS-P | PO2/ | EFF-P | EFF-AD | EFF-P | M-1 | M-2 | M1-1 | M1-2 |
|----|--------|--------|--------|--------|--------|---------|-------|---------|---------|-------|-------|--------|--------|--------|--------|--------|--------|
| | DEGREE | DEGREE | DEGREE | DEGREE | DEGREE | SHOCK | | | PROFILE | POI | TOTAL | STATIC | | | | | |
| 5 | -4.50 | -1.58 | 10.43 | 43.49 | 55.89 | 0.000 | 3.757 | 1594 | 0.396 | 0.255 | 0.000 | 0.000 | 0.664 | 0.9810 | 0.7588 | 0.801 | 1.2174 |
| 10 | -4.17 | -1.23 | 8.35 | 44.11 | 53.86 | 0.000 | 3.737 | 1219 | 0.311 | 0.246 | 0.000 | 0.000 | 0.647 | 0.9290 | 0.7330 | 0.7755 | 1.2281 |
| 15 | -3.94 | -0.99 | 7.37 | 44.12 | 52.45 | 0.016 | 3.639 | 0713 | 0.186 | 0.162 | 0.000 | 0.000 | 0.835 | 0.8935 | 0.7139 | 0.8416 | 1.2371 |
| 30 | -4.45 | -1.45 | 8.49 | 40.68 | 50.67 | 0.024 | 3.589 | 0747 | 0.209 | 0.203 | 0.000 | 0.000 | 0.8194 | 0.8668 | 0.6989 | 0.876 | 1.2704 |
| 50 | -3.93 | -0.79 | 8.92 | 39.89 | 49.61 | 0.033 | 3.710 | 0433 | 0.133 | 0.123 | 0.000 | 0.000 | 0.8965 | 0.8094 | 0.6572 | 0.9105 | 1.3182 |
| 70 | -4.17 | -0.93 | 9.36 | 39.57 | 49.95 | 0.016 | 4.248 | 0447 | 0.148 | 0.143 | 0.000 | 0.000 | 0.8851 | 0.7503 | 0.5780 | 0.8663 | 1.3550 |
| 85 | -1.48 | 1.83 | 15.34 | 38.36 | 52.02 | 0.038 | 4.709 | 1016 | 0.355 | 0.342 | 0.000 | 0.000 | 0.875 | 0.7370 | 0.5223 | 0.9947 | 1.3385 |
| 90 | -0.51 | 3.84 | 17.62 | 39.83 | 53.61 | 0.064 | 5.026 | 1037 | 0.369 | 0.346 | 0.000 | 0.000 | 0.827 | 0.7241 | 0.4984 | 0.9769 | 1.3335 |
| 95 | 1.92 | 5.29 | 18.49 | 42.78 | 56.03 | 0.065 | 5.600 | 1042 | 0.376 | 0.352 | 0.000 | 0.000 | 0.835 | 0.7034 | 0.4697 | 0.9717 | 1.3442 |

NCORR WCORR TO/TO PO/PO EFF-AD EFF-P WCI/AL
INLET INLET INLET INLET
RPM LBM/SEC % SQFT
11675. 189.66 1.2426 1.8086 75.95 77.86 41.45

STA-1 STA-2
---LOCAL---

10.0 11.0

TABLE 11.4

BLADE-ELEMENT AND OVERALL PERFORMANCE WITH UNIFORM INLET 105 PERCENT OF DESIGN SPEED

Rotor

| %SPAN | DIA-1 IN | DIA-2 IN | V-1 FT/SEC | V-2 FT/SEC | VM-1 FT/SEC | VM-2 FT/SEC | VO-1 FT/SEC | VO-2 FT/SEC | B-1 DEGREE | B-2 DEGREE | B1-1 DEGREE | B1-2 DEGREE | V1-1 FT/SEC | V1-2 FT/SEC | VO1-1 FT/SEC | VO1-2 FT/SEC | U-1 FT/SEC | U-2 FT/SEC |
|-------|----------------|----------------|---------------|----------------|------------------|------------------|------------------|-----------------|-------------------|---------------|----------------|-----------------|-----------------|----------------|-----------------|-----------------|---------------|---------------|
| 5 | 17.467 | 19.769 | 610.9 | 1054.8 | 610.9 | 720.5 | 0 | 770.4 | 0.0 | 46.92 | 55.46 | 18.00 | 1077.5 | 757.6 | -887.6 | -234.1 | 887.6 | 1004.5 |
| 10 | 18.467 | 20.408 | 627.2 | 1001.5 | 627.2 | 686.3 | 0 | 729.4 | 0.0 | 46.75 | 56.24 | 24.16 | 1128.7 | 752.9 | -938.4 | -307.6 | 938.4 | 1037.0 |
| 15 | 19.467 | 21.047 | 641.9 | 949.6 | 641.9 | 653.1 | 0 | 689.3 | 0.0 | 46.54 | 57.02 | 30.15 | 1179.2 | 756.2 | -989.2 | -380.1 | 989.2 | 1069.5 |
| 30 | 22.314 | 22.964 | 675.7 | 919.3 | 675.7 | 671.4 | 0 | 628.0 | 0.0 | 43.08 | 59.21 | 38.71 | 1319.9 | 861.5 | -1133.8 | -538.9 | 1133.8 | 1166.9 |
| 50 | 25.791 | 25.520 | 691.1 | 859.4 | 691.1 | 638.9 | 0 | 574.8 | 0.0 | 41.97 | 62.19 | 48.44 | 1481.6 | 964.9 | -1310.5 | -722.0 | 1310.5 | 1276.7 |
| 70 | 28.954 | 28.076 | 672.3 | 780.0 | 672.3 | 581.6 | 0 | 519.7 | 0.0 | 41.79 | 65.44 | 57.31 | 1617.6 | 1077.6 | -1471.2 | -906.9 | 1471.2 | 1426.6 |
| 85 | 31.295 | 29.993 | 643.9 | 752.6 | 643.9 | 521.6 | 0 | 542.0 | 0.0 | 46.12 | 67.95 | 62.03 | 1715.6 | 1112.2 | -1590.2 | -982.0 | 1590.2 | 1524.0 |
| 90 | 31.883 | 30.630 | 637.1 | 731.6 | 637.1 | 473.1 | 0 | 557.8 | 0.0 | 49.72 | 68.53 | 64.65 | 1740.8 | 1105.2 | -1620.1 | -998.6 | 1620.1 | 1556.4 |
| 95 | 32.499 | 31.271 | 632.3 | 698.5 | 632.3 | 421.6 | 0 | 556.9 | 0.0 | 52.87 | 69.05 | 67.78 | 1768.3 | 1114.9 | -1651.4 | -1032.1 | 1651.4 | 1589.0 |
| %SPAN | INCS DEGREE | INCM DEGREE | DEV DEGREE | TURN DEGREE | CAMBER DEGREE | OMEGA-B SHOCK | U-FAC OMEGA-B | LOSS-P TOTAL | LOSS-P PROFILE | PO2/ %01 | EFF-P TOTAL | EFF-AD TOTAL | EFF-P STATIC | M-1 | M-2 | M1-1 | M1-2 | |
| 5 | 0.6 | 6.49 | 16.13 | 37.46 | 47.12 | 0.173 | 4636 | 0.096 | 0.187 | 0.151 | 2.0890 | 9.485 | 9.430 | 0.7133 | 0.5663 | 0.135 | 1.0016 | |
| 10 | 0.25 | 6.60 | 14.49 | 32.08 | 39.94 | 0.224 | 4890 | 1.157 | 0.264 | 0.216 | 2.0145 | 9.208 | 9.125 | 0.8008 | 0.5840 | 0.8627 | 1.0569 | |
| 15 | 0.48 | 6.29 | 13.63 | 26.87 | 34.01 | 0.298 | 5046 | 1.506 | 0.313 | 0.250 | 1.9443 | 8.947 | 8.843 | 0.8575 | 0.5986 | 0.8142 | 1.0508 | |
| 30 | 1.34 | 5.29 | 8.99 | 20.50 | 24.20 | 0.598 | 4773 | 0.106 | 0.234 | 0.106 | 1.9540 | 9.063 | 8.969 | 0.8846 | 0.6308 | 0.7855 | 1.2422 | |
| 50 | 2.75 | 5.33 | 6.19 | 13.75 | 14.68 | 1.041 | 4664 | 1.472 | 0.298 | 0.083 | 1.8969 | 8.531 | 8.393 | 0.8328 | 0.7274 | 1.3948 | 0.6168 | |
| 70 | 4.09 | 5.84 | 6.89 | 8.13 | 9.20 | 1.436 | 4406 | 1.868 | 0.341 | 0.074 | 1.7989 | 7.857 | 7.674 | 0.7785 | 0.6214 | 1.6545 | 1.5154 | |
| 85 | 4.62 | 5.83 | 7.99 | 5.92 | 8.08 | 1.693 | 4034 | 2.661 | 0.451 | 0.162 | 1.7645 | 6.897 | 6.641 | 0.8817 | 0.5960 | 0.6224 | 1.5921 | |
| 90 | 4.74 | 5.78 | 9.63 | 3.89 | 7.73 | 1.773 | 4806 | 3.098 | 0.488 | 0.204 | 1.7397 | 6.437 | 6.149 | 0.9403 | 0.5892 | 0.6004 | 1.6154 | |
| 95 | 4.85 | 5.74 | 11.97 | 1.27 | 7.49 | 1.888 | 4852 | 3.354 | 0.475 | 0.207 | 1.7066 | 6.110 | 5.808 | 0.6161 | 0.5852 | 0.5701 | 1.6377 | |

TO/TO PO/PO EFF-AD EFF-P
INLET INLET INLET INLET
1.2447 1.8792 80.64 82.27

STA-1 STA-2
---LOCAL---
8.0 9.0

Stator

| %SPAN | DIA-1 IN | DIA-2 IN | V-1 FT/SEC | V-2 FT/SEC | VM-1 FT/SEC | VM-2 FT/SEC | VO-1 FT/SEC | VO-2 FT/SEC | B-1 DEGREE | B-2 DEGREE | B-1-1 DEGREE | B-1-2 DEGREE | V-1-1 FT/SEC | V-1-2 FT/SEC | VO-1-1 FT/SEC | VO-1-2 FT/SEC | U-1 FT/SEC | U-2 FT/SEC |
|-------|-------------|-------------|---------------|---------------|----------------|----------------|----------------|----------------|---------------|---------------|-----------------|-----------------|-----------------|-----------------|------------------|------------------|---------------|---------------|
| 5 | 20.409 | 21.489 | 1119.3 | 870.5 | 834.3 | 870.0 | 746.3 | -31.3 | 41.81 | -2.06 | 19.22 | 52.24 | 883.5 | 1420.8 | -290.8 | -1123.2 | 1037.0 | 1091.7 |
| 10 | 21.008 | 21.961 | 1068.8 | 838.3 | 799.8 | 836.9 | 709.0 | -48.3 | 41.56 | -3.31 | 24.15 | 54.29 | 877.0 | 1434.0 | -358.5 | -1184.2 | 1067.5 | 1115.9 |
| 15 | 21.589 | 22.432 | 1019.8 | 813.2 | 767.0 | 811.6 | 672.1 | -50.0 | 41.22 | -3.52 | 28.96 | 55.70 | 877.2 | 1440.4 | -424.9 | -1189.9 | 1097.0 | 1139.8 |
| 30 | 23.314 | 23.902 | 992.7 | 798.2 | 776.5 | 797.6 | 618.4 | -29.5 | 38.53 | -2.12 | 36.07 | 57.33 | 961.4 | 1477.9 | -566.2 | -1244.1 | 1184.7 | 1214.5 |
| 50 | 25.601 | 25.893 | 942.5 | 760.9 | 748.3 | 760.4 | 572.9 | -28.4 | 37.43 | -2.15 | 44.17 | 60.49 | 1044.5 | 1544.6 | -727.9 | -1344.4 | 1300.9 | 1315.7 |
| 70 | 27.818 | 27.992 | 882.6 | 681.5 | 710.5 | 679.9 | 523.6 | -46.0 | 36.39 | -3.86 | 51.39 | 65.08 | 1138.8 | 1614.1 | -889.9 | -1463.8 | 1413.5 | 1417.8 |
| 85 | 29.408 | 29.382 | 878.3 | 628.9 | 683.4 | 628.8 | 551.4 | -1.5 | 38.90 | -1.3 | 54.07 | 67.18 | 1164.6 | 1621.5 | -942.8 | -1494.5 | 1494.3 | 1493.0 |
| 90 | 29.914 | 29.856 | 868.8 | 606.7 | 654.7 | 606.7 | 571.0 | 4.6 | 41.10 | .43 | 55.40 | 68.14 | 1153.0 | 1629.7 | -949.0 | -1512.5 | 1520.0 | 1517.1 |
| 95 | 30.382 | 30.293 | 848.1 | 570.6 | 625.1 | 570.4 | 573.1 | -12.3 | 42.52 | -1.24 | 57.22 | 69.81 | 1154.5 | 1653.2 | -970.7 | -1551.6 | 1543.8 | 1539.3 |

| %SPAN | INCS DEGREE | INCM DEGREE | DEV DEGREE | TURN DEGREE | CAMBER DEGREE | OMEGA-B SHOCK | D-FAC OMEGA-B | LOSS-P TOTAL | LOSS-P PROFILE | PO2/ %01 | EFF-P TOTAL | EFF-AD TOTAL | EFF-P STATIC | M-1 | M-2 | M-1-1 | M-1-2 |
|-------|----------------|----------------|---------------|----------------|------------------|------------------|------------------|-----------------|-------------------|-------------|----------------|-----------------|-----------------|--------|--------|--------|--------|
| 5 | -4.18 | -1.26 | 10.35 | 43.87 | 55.89 | 0.000 | 3909 | 1.140 | 0.363 | 0.329 | 0.000 | 0.000 | 0.000 | 0.7266 | 0.9677 | 0.7348 | 0.7681 |
| 10 | -3.55 | -0.62 | 8.13 | 44.77 | 53.86 | 0.016 | 3929 | 1.125 | 0.286 | 0.282 | 0.000 | 0.000 | 0.000 | 0.7985 | 0.9154 | 0.7072 | 0.7596 |
| 15 | -3.27 | -0.32 | 7.45 | 44.74 | 52.46 | 0.020 | 3847 | 0.632 | 0.165 | 0.160 | 0.000 | 0.000 | 0.000 | 0.8749 | 0.8792 | 0.6854 | 0.7646 |
| 30 | -3.87 | -0.87 | 9.10 | 40.65 | 50.68 | 0.027 | 3771 | 0.708 | 0.199 | 0.191 | 0.000 | 0.000 | 0.000 | 0.8403 | 0.8540 | 0.6718 | 0.8333 |
| 50 | -3.25 | -0.12 | 9.89 | 39.58 | 49.61 | 0.041 | 3870 | 0.454 | 0.139 | 0.126 | 0.000 | 0.000 | 0.000 | 0.8967 | 0.8033 | 0.6361 | 0.8968 |
| 70 | -3.21 | 0.3 | 9.64 | 40.25 | 49.94 | 0.037 | 4415 | 0.426 | 0.141 | 0.132 | 0.000 | 0.000 | 0.000 | 0.8950 | 0.7490 | 0.5661 | 0.9689 |
| 85 | -4.43 | 2.88 | 15.75 | 39.04 | 52.02 | 0.059 | 5043 | 0.949 | 0.332 | 0.311 | 0.000 | 0.000 | 0.000 | 0.8268 | 0.7364 | 0.5142 | 0.9761 |
| 90 | 1.59 | 4.91 | 17.84 | 40.57 | 53.60 | 0.094 | 5336 | 0.957 | 0.340 | 0.307 | 0.000 | 0.000 | 0.000 | 0.8431 | 0.7237 | 0.4925 | 0.9604 |
| 95 | 2.84 | 6.20 | 18.45 | 43.76 | 56.03 | 0.091 | 5766 | 1.011 | 0.364 | 0.332 | 0.000 | 0.000 | 0.000 | 0.8436 | 0.7033 | 0.4609 | 0.9559 |

NCORR WCORR TO/TO PO/PO EFF-AD EFF-P
INLET INLET INLET INLET
11645 184.61 1.2447 1.8341 77.26 79.10 41.44

STA-1 STA-2
---LOCAL---
10.0 11.0

TABLE 11.5

BLADE-ELEMENT AND OVER ALL PERFORMANCE WITH UNIFORM INLET
105 PERCENT OF DESIGN SPEED

Rotor

| %SPAN | DIA-1 | DIA-2 | V-1 | V-2 | VM-1 | VM-2 | VO-1 | VO-2 | B-1 | B-2 | B*-1 | B*-2 | V*-1 | V*-2 | VO*-1 | VO*-2 | U-1 | U-2 |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|--------|--------|--------|
| | IN | IN | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | DEGREE | DEGREE | DEGREE | DEGREE | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC |
| 5 | 17.467 | 19.769 | 599.0 | 1007.4 | 599.0 | 624.4 | 0 | 790.6 | 0.00 | 51.70 | 56.00 | 18.98 | 1071.3 | 660.3 | -888.2 | -214.7 | 888.2 | 1005.3 |
| 10 | 18.467 | 20.408 | 614.7 | 970.4 | 614.7 | 617.4 | 0 | 748.7 | 0.00 | 50.49 | 56.79 | 25.07 | 1122.4 | 681.9 | -939.1 | -289.1 | 939.1 | 1037.8 |
| 15 | 19.467 | 21.047 | 629.4 | 939.7 | 629.4 | 613.8 | 0 | 711.6 | 0.00 | 49.22 | 57.55 | 30.28 | 1173.1 | 711.2 | -989.9 | -358.7 | 989.9 | 1070.3 |
| 30 | 22.314 | 22.964 | 660.8 | 872.7 | 660.8 | 562.8 | 0 | 667.0 | 0.00 | 49.84 | 59.78 | 41.63 | 1313.1 | 753.6 | -1134.7 | -500.8 | 1134.7 | 1167.7 |
| 50 | 25.791 | 25.520 | 676.5 | 841.4 | 676.5 | 557.0 | 0 | 630.7 | 0.00 | 48.55 | 62.71 | 50.13 | 1475.7 | 869.1 | -1311.5 | -667.0 | 1311.5 | 1297.7 |
| 70 | 28.954 | 28.076 | 667.7 | 810.7 | 667.7 | 538.7 | 0 | 605.8 | 0.00 | 48.36 | 65.60 | 56.75 | 1616.7 | 983.7 | -1472.3 | -821.9 | 1472.3 | 1437.7 |
| 85 | 31.295 | 29.993 | 644.8 | 835.8 | 644.8 | 528.3 | 0 | 647.3 | 0.00 | 50.80 | 67.94 | 58.95 | 1717.1 | 1024.2 | -1591.4 | -877.5 | 1591.4 | 1525.2 |
| 90 | 31.883 | 30.630 | 637.5 | 831.9 | 637.5 | 494.2 | 0 | 669.3 | 0.00 | 53.56 | 68.53 | 60.91 | 1742.1 | 1016.5 | -1621.3 | -888.3 | 1621.3 | 1557.6 |
| 95 | 32.499 | 31.271 | 630.8 | 829.4 | 630.8 | 429.4 | 0 | 671.7 | 0.00 | 57.41 | 69.11 | 64.94 | 1768.9 | 1014.0 | -1652.6 | -918.5 | 1652.6 | 1590.2 |

Stator

| %SPAN | INCS | INCM | DEV | TURN | CAMBER | OMEGA-B | D-FAC | OMEGA-B | LOSS-P | PO2/ | PO1 | EFF-P | EFF-AD | EFF-P | M-1 | M-2 | M*-1 | M*-2 |
|-------|--------|--------|--------|--------|--------|---------|-------|---------|--------|---------|--------|-------|--------|--------|------|-------|--------|--------|
| | DEGREE | DEGREE | DEGREE | DEGREE | SHOCK | | | | TOTAL | PROFILE | | TOTAL | TOTAL | STATIC | | | | |
| 5 | 59 | 7.02 | 17.11 | 37.03 | 47.12 | 0.188 | 5558 | 0.656 | 0.136 | 0.037 | 2.1514 | 9.631 | 9.591 | 9.446 | 5534 | 8.635 | 9.909 | 15.660 |
| 10 | 77 | 7.17 | 15.43 | 31.72 | 39.97 | 0.236 | 5536 | 0.593 | 0.104 | 0.074 | 2.1183 | 9.631 | 9.591 | 9.484 | 5700 | 8.296 | 1.0438 | 15.829 |
| 15 | 98 | 6.90 | 13.76 | 27.27 | 34.02 | 0.310 | 5451 | 0.499 | 0.104 | 0.039 | 2.0939 | 9.655 | 9.618 | 9.545 | 5846 | 8.017 | 1.0938 | 16.068 |
| 30 | 1.85 | 5.87 | 11.91 | 18.15 | 24.19 | 0.610 | 5649 | 1.032 | 0.218 | 0.094 | 2.0420 | 9.141 | 9.050 | 9.010 | 6145 | 7.363 | 1.2260 | 16.260 |
| 50 | 3.09 | 5.76 | 7.79 | 12.58 | 14.62 | 1.053 | 5408 | 1.295 | 0.251 | 0.095 | 2.0558 | 8.927 | 8.702 | 8.729 | 6293 | 7.034 | 1.3730 | 16.265 |
| 70 | 4.11 | 5.96 | 6.16 | 8.85 | 9.06 | 1.440 | 5170 | 1.599 | 0.297 | 0.030 | 2.3562 | 8.807 | 8.236 | 8.324 | 6208 | 6.710 | 1.5000 | 16.134 |
| 85 | 4.55 | 5.82 | 4.78 | 8.99 | 7.96 | 1.698 | 5373 | 2.234 | 0.417 | 0.105 | 2.1216 | 7.802 | 7.560 | 7.631 | 5998 | 6.825 | 1.5847 | 16.263 |
| 90 | 4.68 | 5.77 | 5.77 | 7.62 | 7.62 | 1.779 | 5554 | 2.645 | 0.474 | 0.160 | 2.1229 | 7.450 | 7.171 | 7.267 | 5912 | 6.742 | 1.6107 | 16.238 |
| 95 | 4.89 | 5.80 | 9.07 | 4.17 | 7.44 | 1.895 | 5666 | 2.988 | 0.475 | 0.177 | 2.0816 | 7.103 | 6.796 | 6.971 | 5842 | 6.417 | 1.6351 | 16.161 |

TO/TO PO/PO EFF-AD EFF-P
INLET INLET INLET INLET

STA-1 STA-2
---LOCAL---

1.2750 2.0769 84.29 85.83

8.0 9.0

Stator

| %SPAN | DIA-1 | DIA-2 | V-1 | V-2 | VM-1 | VM-2 | VO-1 | VO-2 | B-1 | B-2 | B*-1 | B*-2 | V*-1 | V*-2 | VO*-1 | VO*-2 | U-1 | U-2 |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|--------|--------|
| | IN | IN | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | DEGREE | DEGREE | DEGREE | DEGREE | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC |
| 5 | 20.409 | 21.489 | 1049.9 | 706.3 | 718.2 | 705.8 | 765.8 | -28.5 | 46.84 | -2.31 | 20.74 | 57.81 | 768.0 | 1324.9 | -272.0 | -1121.2 | 1037.8 | 1092.7 |
| 10 | 21.008 | 21.961 | 1014.4 | 675.8 | 707.7 | 674.2 | 727.2 | -44.9 | 45.78 | -3.82 | 25.72 | 59.86 | 785.7 | 1343.3 | -341.1 | -1161.7 | 1066.3 | 1116.7 |
| 15 | 21.589 | 22.432 | 985.9 | 651.7 | 700.4 | 649.9 | 693.8 | -48.5 | 44.73 | -4.26 | 29.97 | 61.34 | 808.9 | 1355.2 | -404.1 | -1189.1 | 1097.8 | 1140.7 |
| 30 | 23.314 | 23.922 | 926.7 | 646.3 | 653.3 | 646.2 | 657.2 | -6.4 | 45.17 | -5.7 | 38.94 | 62.12 | 840.4 | 1382.2 | -528.3 | -1221.8 | 1185.5 | 1215.4 |
| 50 | 25.601 | 25.893 | 907.4 | 656.5 | 653.7 | 656.4 | 629.3 | -13.8 | 43.91 | -1.20 | 45.80 | 63.74 | 938.0 | 1483.5 | -672.6 | -1330.4 | 1301.8 | 1316.7 |
| 70 | 27.818 | 27.902 | 897.8 | 646.4 | 656.3 | 645.2 | 612.6 | -3.5 | 43.03 | -3.50 | 50.71 | 66.13 | 1036.3 | 1594.7 | -802.0 | -1458.3 | 1414.6 | 1418.8 |
| 85 | 29.408 | 29.382 | 944.0 | 650.8 | 671.9 | 650.7 | 663.1 | 10.9 | 44.62 | .96 | 51.09 | 66.31 | 1069.7 | 1619.6 | -832.4 | -1483.2 | 1495.4 | 1494.1 |
| 90 | 29.914 | 29.856 | 948.4 | 658.6 | 653.5 | 658.1 | 687.2 | 24.0 | 46.44 | 2.09 | 51.92 | 66.23 | 1059.5 | 1632.7 | -833.9 | -1494.2 | 1521.2 | 1518.2 |
| 95 | 30.362 | 30.293 | 927.6 | 636.4 | 618.2 | 636.4 | 691.6 | 4.0 | 48.21 | .36 | 54.08 | 67.50 | 1053.8 | 1663.0 | -853.4 | -1536.4 | 1545.0 | 1540.4 |

| %SPAN | INCS | INCM | DEV | TURN | CAMBER | OMEGA-B | D-FAC | OMEGA-B | LOSS-P | PO2/ | PO1 | EFF-P | EFF-AD | EFF-P | M-1 | M-2 | M*-1 | M*-2 |
|-------|--------|--------|--------|--------|--------|---------|-------|---------|--------|---------|-------|-------|--------|--------|------|------|------|--------|
| | DEGREE | DEGREE | DEGREE | DEGREE | SHOCK | | | | TOTAL | PROFILE | | TOTAL | TOTAL | STATIC | | | | |
| 5 | 67 | 3.59 | 10.10 | 49.15 | 59.80 | 0.057 | 5109 | 1.526 | 0.379 | 0.365 | 9.371 | 0.000 | 0.000 | 7848 | 8961 | 5840 | 6637 | 10955 |
| 10 | 35 | 3.28 | 7.62 | 49.60 | 53.88 | 0.062 | 5244 | 1.561 | 0.397 | 0.382 | 9.389 | 0.000 | 0.000 | 7866 | 8671 | 5587 | 6807 | 11107 |
| 15 | 38 | 3.33 | 6.59 | 48.98 | 52.34 | 0.066 | 5325 | 1.595 | 0.416 | 0.399 | 9.403 | 0.000 | 0.000 | 7706 | 8439 | 5385 | 6953 | 11197 |
| 30 | 2.71 | 5.71 | 10.65 | 45.74 | 50.67 | 0.158 | 5012 | 0.855 | 0.240 | 0.196 | 9.713 | 0.000 | 0.000 | 8656 | 7877 | 5325 | 7125 | 11390 |
| 50 | 3.21 | 6.34 | 10.81 | 45.11 | 49.56 | 0.226 | 4924 | 0.805 | 0.185 | 0.116 | 9.806 | 0.000 | 0.000 | 9018 | 7654 | 5386 | 7873 | 112172 |
| 70 | 3.38 | 6.61 | 9.94 | 46.53 | 49.85 | 0.251 | 5205 | 0.684 | 0.226 | 0.144 | 9.787 | 0.000 | 0.000 | 8914 | 7505 | 5266 | 8640 | 112992 |
| 85 | 5.09 | 8.40 | 16.86 | 43.66 | 52.00 | 0.349 | 5522 | 1.550 | 0.542 | 0.420 | 9.487 | 0.000 | 0.000 | 7739 | 7794 | 5222 | 8843 | 112997 |
| 90 | 6.68 | 10.01 | 19.56 | 44.35 | 53.63 | 0.429 | 5544 | 1.935 | 0.510 | 0.367 | 9.526 | 0.000 | 0.000 | 7909 | 7801 | 5253 | 8724 | 113023 |
| 95 | 8.42 | 11.79 | 20.05 | 47.85 | 56.02 | 0.455 | 5816 | 1.915 | 0.474 | 0.310 | 9.585 | 0.000 | 0.000 | 7967 | 7598 | 5049 | 8599 | 113194 |

NCORR WCORR TO/TO PO/PO EFF-AD EFF-P WCI/A1
INLET INLET INLET INLET
RPM LBM/SEC \$ S SFT
11654. 183.22 1.2750 2.0022 79.62 81.53 41.13

STA-1 STA-2
---LOCAL---

10.0 11.0

TABLE 11.6

BLADE-ELEMENT AND OVERALL PERFORMANCE WITH UNIFORM INLET 105 PERCENT OF DESIGN SPEED

Rotor

| %SPAN | DIA-1 IN | DIA-2 IN | V-1 FT/SEC | V-2 FT/SEC | VM-1 FT/SEC | VM-2 FT/SEC | VO-1 FT/SEC | VO-2 FT/SEC | B-1 DEGREE | B-2 DEGREE | B-1-1 DEGREE | B-1-2 DEGREE | V'-1 FT/SEC | V'-2 FT/SEC | VO'-1 FT/SEC | VO'-2 FT/SEC | U-1 FT/SEC | U-2 FT/SEC |
|-------|-------------|-------------|---------------|---------------|----------------|----------------|----------------|----------------|---------------|---------------|-----------------|-----------------|----------------|----------------|-----------------|-----------------|---------------|---------------|
| 5 | 17.467 | 19.769 | 593.5 | 1004.9 | 593.5 | 601.5 | .0 | 805.0 | .00 | 53.23 | 56.32 | 18.64 | 1070.1 | 634.8 | -890.5 | -202.8 | 890.5 | 1007.8 |
| 10 | 18.467 | 20.408 | 608.9 | 964.2 | 608.9 | 589.4 | .0 | 763.1 | .00 | 52.32 | 57.11 | 25.18 | 1121.2 | 651.5 | -941.5 | -277.3 | 941.5 | 1040.4 |
| 15 | 19.467 | 21.047 | 623.1 | 936.4 | 623.1 | 589.6 | .0 | 727.5 | .00 | 50.98 | 57.88 | 30.36 | 1171.8 | 683.7 | -992.4 | -345.5 | 992.4 | 1073.0 |
| 30 | 22.314 | 22.964 | 653.7 | 871.6 | 653.7 | 539.8 | .0 | 688.4 | .00 | 51.73 | 60.12 | 41.99 | 1312.0 | 726.8 | -1137.6 | -486.4 | 1137.6 | 1170.7 |
| 50 | 25.791 | 25.520 | 669.1 | 852.1 | 669.1 | 542.9 | .0 | 656.8 | .00 | 50.42 | 63.03 | 49.68 | 1475.3 | 842.5 | -1314.8 | -644.3 | 1314.8 | 1301.0 |
| 70 | 28.954 | 28.076 | 659.8 | 834.6 | 659.8 | 524.1 | .0 | 649.5 | .00 | 51.10 | 65.92 | 56.16 | 1616.8 | 941.3 | -1476.1 | -781.8 | 1476.1 | 1431.3 |
| 85 | 31.295 | 29.993 | 637.3 | 852.2 | 637.3 | 501.7 | .0 | 688.9 | .00 | 53.94 | 68.22 | 59.16 | 1718.0 | 978.6 | -1595.4 | -840.2 | 1595.4 | 1539.0 |
| 90 | 31.883 | 30.630 | 630.4 | 846.9 | 630.4 | 463.2 | .0 | 708.8 | .00 | 56.84 | 68.80 | 61.49 | 1743.4 | 970.5 | -1625.4 | -852.7 | 1625.4 | 1551.5 |
| 95 | 32.499 | 31.271 | 623.8 | 835.8 | 623.8 | 437.5 | .0 | 712.1 | .00 | 58.44 | 69.37 | 63.62 | 1770.4 | 984.6 | -1656.8 | -882.1 | 1656.8 | 1594.2 |

| %SPAN | INCS DEGREE | INCH DEGREE | DEV DEGREE | TURN DEGREE | CAMBER DEGREE | OMEGA-B DEGREE | D-FAC DEGREE | LOSS-P DEGREE | PO2/ TOTAL | EFF-P TOTAL | EFF-AD TOTAL | STATIC | M-1 | M-2 | M-1-1 | M-1-2 |
|-------|----------------|----------------|---------------|----------------|------------------|-------------------|-----------------|------------------|---------------|----------------|-----------------|--------|-------|-------|--------|-------|
| 5 | .91 | 7.34 | 16.77 | 37.68 | 47.12 | .0199 | .5823 | .0053 | 2.2023 | .9746 | .9715 | .9625 | .5478 | .8590 | .9889 | .5426 |
| 10 | 1.08 | 7.49 | 15.53 | 31.93 | 35.97 | .0248 | .5833 | .0100 | 2.1623 | .9705 | .9672 | .9595 | .5639 | .8215 | 1.0412 | .5651 |
| 15 | 1.29 | 7.24 | 13.84 | 27.52 | 34.02 | .0323 | .5716 | .0075 | 2.1447 | .9750 | .9722 | .9675 | .5780 | .7963 | 1.0907 | .5814 |
| 30 | 2.17 | 6.19 | 12.26 | 18.12 | 24.19 | .0626 | .5886 | .0190 | 2.1003 | .9264 | .9184 | .9152 | .6071 | .7330 | 1.2220 | .6111 |
| 50 | 3.39 | 6.07 | 7.52 | 13.15 | 14.60 | .1072 | .5640 | .0233 | 2.1385 | .8461 | .8843 | .8859 | .6219 | .7096 | 1.3698 | .7017 |
| 70 | 4.42 | 6.27 | 5.57 | 9.76 | 9.06 | .1462 | .5517 | .0314 | 2.1625 | .8440 | .8261 | .8327 | .6129 | .6867 | 1.4981 | .7744 |
| 85 | 4.84 | 6.11 | 4.99 | 9.07 | 7.96 | .1720 | .5726 | .0430 | 2.2240 | .7839 | .7586 | .7649 | .5924 | .6912 | 1.5833 | .7937 |
| 90 | 4.95 | 6.05 | 6.34 | 7.31 | 7.61 | .1803 | .5904 | .0477 | 2.2249 | .7514 | .7224 | .7314 | .5845 | .6818 | 1.6093 | .7813 |
| 95 | 5.14 | 6.06 | 7.72 | 5.75 | 7.42 | .1919 | .5920 | .0486 | 2.2217 | .7338 | .7029 | .7144 | .5776 | .6696 | 1.6341 | .7889 |

TO/TO PO/PO EFF-AD EFF-P
INLET INLET INLET INLET

1.2887 2.1609 85.13 86.68

STA-1 STA-2

---LOCAL---

8.0 9.0

Stator

| %SPAN | DIA-1 IN | DIA-2 IN | V-1 FT/SEC | V-2 FT/SEC | VM-1 FT/SEC | VM-2 FT/SEC | VO-1 FT/SEC | VO-2 FT/SEC | B-1 DEGREE | B-2 DEGREE | B-1-1 DEGREE | B-1-2 DEGREE | V'-1 FT/SEC | V'-2 FT/SEC | VO'-1 FT/SEC | VO'-2 FT/SEC | U-1 FT/SEC | U-2 FT/SEC |
|-------|-------------|-------------|---------------|---------------|----------------|----------------|----------------|----------------|---------------|---------------|-----------------|-----------------|----------------|----------------|-----------------|-----------------|---------------|---------------|
| 5 | 20.409 | 21.489 | 1039.9 | 654.1 | 688.0 | 653.8 | 779.8 | -20.9 | 48.58 | -1.83 | 20.75 | 58.64 | 735.8 | 1293.8 | -260.7 | -1116.4 | 1040.5 | 1095.5 |
| 10 | 21.008 | 21.961 | 1001.2 | 628.4 | 673.0 | 627.2 | 741.2 | -38.8 | 47.76 | -2.56 | 26.10 | 61.56 | 749.6 | 1317.4 | -329.8 | -1158.4 | 1071.0 | 1119.6 |
| 15 | 21.589 | 22.432 | 975.2 | 606.5 | 669.2 | 604.6 | 709.3 | -47.5 | 46.66 | -4.48 | 30.31 | 63.09 | 775.5 | 1335.7 | -391.3 | -1191.0 | 1100.6 | 1143.6 |
| 30 | 23.314 | 23.902 | 918.6 | 595.0 | 623.6 | 599.0 | 674.5 | -3.0 | 47.24 | -2.29 | 39.48 | 63.88 | 808.3 | 1360.5 | -514.1 | -1221.5 | 1188.6 | 1218.5 |
| 50 | 25.601 | 25.893 | 911.5 | 623.3 | 633.3 | 623.1 | 655.6 | -13.3 | 45.99 | -0.23 | 45.72 | 64.95 | 907.3 | 1471.8 | -649.6 | -1333.4 | 1305.1 | 1320.0 |
| 70 | 27.818 | 27.902 | 915.1 | 638.2 | 637.4 | 637.7 | 656.7 | -23.6 | 45.85 | -2.12 | 50.07 | 66.20 | 993.0 | 1580.4 | -761.5 | -1446.0 | 1418.2 | 1422.4 |
| 85 | 29.408 | 29.382 | 954.6 | 651.9 | 643.3 | 651.8 | 705.3 | 12.3 | 47.63 | 1.08 | 50.99 | 66.31 | 1021.9 | 1822.3 | -794.0 | -1485.6 | 1499.2 | 1497.9 |
| 90 | 29.914 | 29.856 | 958.0 | 655.1 | 621.8 | 654.8 | 728.9 | 17.5 | 49.53 | 1.53 | 52.01 | 66.48 | 1010.2 | 1840.9 | -796.2 | -1504.6 | 1525.0 | 1522.1 |
| 95 | 30.382 | 30.293 | 956.0 | 647.3 | 613.4 | 647.2 | 733.2 | 12.6 | 50.08 | 1.11 | 53.05 | 67.09 | 1020.6 | 1862.9 | -815.6 | -1531.8 | 1548.9 | 1544.3 |

| %SPAN | INCS DEGREE | INCM DEGREE | DEV DEGREE | TURN DEGREE | CAMBER DEGREE | OMEGA-B SHOCK | D-FAC | OMEGA-B | LOSS-P TOTAL | PO2/ TOTAL | EFF-P TOTAL | EFF-AD TOTAL | STATIC | M-1 | M-2 | M-1-1 | M-1-2 |
|-------|----------------|----------------|---------------|----------------|------------------|------------------|-------|---------|-----------------|---------------|----------------|-----------------|--------|-------|-------|-------|--------|
| 5 | 2.41 | 5.33 | 10.58 | 50.41 | 55.90 | .0093 | .5577 | .1714 | .0426 | .0403 | .9306 | .0000 | .7787 | .8841 | .5371 | .6320 | 1.0024 |
| 10 | 2.34 | 5.27 | 7.91 | 51.32 | 53.90 | .0104 | .5672 | .1612 | .0410 | .0384 | .9385 | .0000 | .7922 | .8534 | .5162 | .6461 | 1.0021 |
| 15 | 2.28 | 5.22 | 6.36 | 51.15 | 52.33 | .0112 | .5776 | .1679 | .0438 | .0409 | .9386 | .0000 | .7762 | .8326 | .4979 | .6633 | 1.0066 |
| 30 | 4.76 | 7.75 | 10.92 | 47.53 | 50.66 | .0244 | .5523 | .1103 | .0310 | .0241 | .9637 | .0000 | .8486 | .7779 | .4903 | .6802 | 1.1366 |
| 50 | 5.27 | 8.39 | 10.79 | 47.21 | 49.56 | .0347 | .5398 | .0959 | .0294 | .0187 | .9692 | .0000 | .8689 | .7654 | .5077 | .7542 | 1.1950 |
| 70 | 6.14 | 9.36 | 11.34 | 47.97 | 49.87 | .0446 | .5487 | .0873 | .0289 | .0141 | .9723 | .0000 | .8852 | .7599 | .5155 | .8196 | 1.2767 |
| 85 | 8.00 | 11.31 | 16.97 | 46.55 | 52.01 | .0580 | .5710 | .1443 | .0505 | .0302 | .9520 | .0000 | .8095 | .7816 | .5192 | .8385 | 1.2200 |
| 90 | 9.70 | 13.02 | 19.05 | 48.01 | 53.68 | .0694 | .5804 | .1424 | .0529 | .0259 | .9528 | .0000 | .8105 | .7814 | .5183 | .8262 | 1.2984 |
| 95 | 10.48 | 13.85 | 20.80 | 48.97 | 56.01 | .0842 | .5951 | .1534 | .0553 | .0322 | .9496 | .0000 | .7675 | .7772 | .5098 | .8359 | 1.3096 |

STA-1 STA-2

---LOCAL---

10.0 11.0

APPENDIX 4

BLADE-ELEMENT AND OVERALL PERFORMANCE WITH RADIAL INLET DISTORTION

BLADE-ELEMENT AND OVERALL PERFORMANCE WITH RADIAL INLET DISTORTION
70 PERCENT OF DESIGN SPEED

Rotor

| %SPAN | DIA-1 IN | DIA-2 IN | V-1 FT/SEC | V-2 FT/SEC | VM-1 FT/SEC | VM-2 FT/SEC | VO-1 FT/SEC | VO-2 FT/SEC | B-1 DEGREE | B-2 DEGREE | B-1 DEGREE | B-2 DEGREE | V ₀ -1 FT/SEC | V ₀ -2 FT/SEC | V ₀ -1 FT/SEC | V ₀ -2 FT/SEC | U-1 FT/SEC | U-2 FT/SEC |
|-------|-------------|-------------|---------------|---------------|----------------|----------------|----------------|----------------|---------------|---------------|---------------|---------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|---------------|---------------|
| 5 | 17.467 | 19.769 | 482.3 | 773.7 | 482.3 | 602.5 | .0 | 485.3 | .00 | 38.85 | 50.83 | 17.05 | 763.7 | 630.3 | -592.1 | -184.8 | 572.1 | 670.1 |
| 10 | 18.467 | 20.408 | 491.1 | 737.8 | 491.1 | 579.8 | .0 | 456.2 | .00 | 38.19 | 51.88 | 22.11 | 765.7 | 626.3 | -626.0 | -235.6 | 626.0 | 671.8 |
| 15 | 19.467 | 21.047 | 497.8 | 706.9 | 497.8 | 564.4 | .0 | 425.4 | .00 | 36.99 | 52.96 | 27.00 | 826.7 | 634.3 | -659.9 | -288.0 | 659.9 | 713.4 |
| 30 | 22.314 | 22.964 | 505.0 | 657.9 | 505.0 | 555.5 | .0 | 352.4 | .00 | 32.37 | 56.25 | 37.43 | 907.6 | 700.7 | -756.4 | -426.1 | 756.4 | 778.4 |
| 50 | 25.771 | 25.520 | 468.3 | 590.7 | 468.3 | 508.8 | .0 | 300.1 | .00 | 30.54 | 61.80 | 47.96 | 992.0 | 760.9 | -874.3 | -565.0 | 874.3 | 865.1 |
| 70 | 28.954 | 28.076 | 365.4 | 528.3 | 365.4 | 443.8 | .0 | 286.3 | .00 | 32.85 | 69.57 | 56.30 | 1047.7 | 800.1 | -981.5 | -665.4 | 981.5 | 951.7 |
| 85 | 31.295 | 29.993 | 334.5 | 495.8 | 334.5 | 382.6 | .0 | 315.1 | .00 | 39.48 | 72.49 | 61.39 | 1112.3 | 799.3 | -1000.8 | -701.6 | 1000.8 | 1016.7 |
| 90 | 31.883 | 30.630 | 330.0 | 486.3 | 330.0 | 362.7 | .0 | 323.8 | .00 | 41.77 | 73.02 | 63.08 | 1130.0 | 801.3 | -1080.0 | -714.5 | 1080.0 | 1038.3 |
| 95 | 32.499 | 31.271 | 322.9 | 473.8 | 322.9 | 342.0 | .0 | 328.0 | .00 | 43.81 | 73.66 | 64.96 | 1148.0 | 808.0 | -1101.6 | -732.0 | 1101.6 | 1060.0 |

STA-1 STA-2
--LOCAL--

8.0 9.0

Stator

| %SPAN | DIA-1 IN | DIA-2 IN | V-1 FT/SEC | V-2 FT/SEC | VM-1 FT/SEC | VM-2 FT/SEC | VO-1 FT/SEC | VO-2 FT/SEC | B-1 DEGREE | B-2 DEGREE | B-1 DEGREE | B-2 DEGREE | V ₀ -1 FT/SEC | V ₀ -2 FT/SEC | V ₀ -1 FT/SEC | V ₀ -2 FT/SEC | U-1 FT/SEC | U-2 FT/SEC |
|-------|-------------|-------------|---------------|---------------|----------------|----------------|----------------|----------------|---------------|---------------|---------------|---------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|---------------|---------------|
| 5 | 20.409 | 21.489 | 826.7 | 771.7 | 800.0 | 771.3 | 470.1 | 25.8 | 34.66 | 1.77 | 18.06 | 42.41 | 715.3 | 1044.7 | -221.7 | -704.6 | 691.8 | 728.4 |
| 10 | 21.008 | 21.761 | 791.9 | 752.1 | 655.8 | 752.0 | 443.9 | 2.7 | 34.09 | .19 | 22.25 | 44.60 | 709.9 | 1056.4 | -268.3 | -741.8 | 712.1 | 744.4 |
| 15 | 21.589 | 22.432 | 761.8 | 731.3 | 638.6 | 731.2 | 415.3 | -11.2 | 33.03 | -.88 | 26.34 | 46.54 | 713.2 | 1063.2 | -316.5 | -771.6 | 731.8 | 760.4 |
| 30 | 23.314 | 23.702 | 715.4 | 687.5 | 625.1 | 687.1 | 347.7 | -22.6 | 29.07 | -1.89 | 35.27 | 50.47 | 766.5 | 1079.9 | -442.6 | -832.8 | 790.3 | 810.2 |
| 50 | 25.601 | 25.893 | 658.0 | 634.8 | 586.0 | 634.1 | 299.1 | -27.04 | 27.04 | -2.69 | 44.12 | 55.05 | 817.0 | 1107.3 | -568.7 | -907.5 | 867.8 | 877.7 |
| 70 | 27.818 | 27.902 | 616.1 | 585.0 | 545.4 | 584.3 | 286.4 | -28.4 | 27.71 | -2.78 | 50.28 | 59.04 | 853.6 | 1136.0 | -656.5 | -974.2 | 943.0 | 945.8 |
| 85 | 29.408 | 29.382 | 607.5 | 560.5 | 516.2 | 560.5 | 320.2 | -2.9 | 31.81 | -.30 | 52.66 | 60.70 | 851.1 | 1145.5 | -676.7 | -998.9 | 996.9 | 996.0 |
| 90 | 29.914 | 29.856 | 607.3 | 548.9 | 508.9 | 548.9 | 331.3 | 6.7 | 33.07 | .69 | 53.30 | 61.37 | 851.5 | 1145.5 | -682.7 | -1005.4 | 1014.0 | 1012.0 |
| 95 | 30.382 | 30.293 | 604.7 | 539.5 | 501.7 | 539.5 | 337.6 | 8.2 | 33.94 | .87 | 54.07 | 62.09 | 854.9 | 1152.7 | -692.3 | -1018.7 | 1029.9 | 1026.9 |

STA-1 STA-2
--LOCAL--

10.0 11.0

NCORR WCORR TO/TO PO/PO EFF-AD EFF-P WCI/AI
INLET INLET INLET INLET INLET LBM/SEC
RPM LBM/SEC
7769. 131.77 1.0927 1.2783 78.44 79.80 29.58

TABLE 12.2

BLADE-ELEMENT AND OVERALL PERFORMANCE WITH RADIAL INLET DISTORTION
70 PERCENT OF DESIGN SPEED

Rotor

| %SPAN | DIA-1 IN | DIA-2 IN | V-1 FT/SEC | V-2 FT/SEC | VM-1 FT/SEC | VM-2 FT/SEC | VO-1 FT/SEC | VO-2 FT/SEC | B-1 DEGREE | B-2 DEGREE | B-1-1 DEGREE | B-1-2 DEGREE | B-2-1 DEGREE | B-2-2 DEGREE | EFF-P FT/SEC | EFF-P FT/SEC | EFF-P FT/SEC | EFF-P FT/SEC | U-1 FT/SEC | U-2 FT/SEC |
|-------|----------------|----------------|---------------|----------------|------------------|-------------------|-----------------|-------------------|------------------|------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| 5 | 17.467 | 19.769 | 459.6 | 755.8 | 459.6 | 570.1 | 0 | 496.3 | 0 | 41.04 | 52.13 | 16.86 | 748.8 | 595.7 | 590.9 | 590.9 | 590.9 | 590.9 | 590.9 | 590.9 |
| 10 | 18.467 | 20.408 | 468.2 | 718.6 | 468.2 | 546.3 | 0 | 466.8 | 0 | 40.51 | 53.16 | 22.28 | 780.9 | 590.9 | 590.9 | 590.9 | 590.9 | 590.9 | 590.9 | 590.9 |
| 15 | 19.467 | 21.047 | 474.5 | 687.5 | 474.5 | 530.3 | 0 | 437.7 | 0 | 39.52 | 54.23 | 27.34 | 811.9 | 597.8 | 597.8 | 597.8 | 597.8 | 597.8 | 597.8 | 597.8 |
| 30 | 22.314 | 22.964 | 480.4 | 641.2 | 480.4 | 521.0 | 0 | 373.5 | 0 | 35.62 | 57.51 | 37.71 | 895.2 | 659.7 | 659.7 | 659.7 | 659.7 | 659.7 | 659.7 | 659.7 |
| 50 | 25.791 | 25.520 | 484.3 | 581.8 | 484.3 | 480.1 | 0 | 328.5 | 0 | 34.39 | 63.00 | 48.07 | 979.6 | 719.6 | 719.6 | 719.6 | 719.6 | 719.6 | 719.6 | 719.6 |
| 70 | 28.954 | 26.076 | 485.5 | 529.3 | 485.5 | 415.4 | 0 | 327.5 | 0 | 38.28 | 70.56 | 56.30 | 1039.5 | 748.7 | 748.7 | 748.7 | 748.7 | 748.7 | 748.7 | 748.7 |
| 85 | 31.295 | 29.993 | 316.9 | 508.5 | 316.9 | 355.8 | 0 | 363.2 | 0 | 45.60 | 73.34 | 61.37 | 1105.5 | 742.7 | 742.7 | 742.7 | 742.7 | 742.7 | 742.7 | 742.7 |
| 90 | 31.883 | 30.630 | 312.5 | 502.5 | 312.5 | 340.2 | 0 | 369.6 | 0 | 47.38 | 73.85 | 62.97 | 1123.4 | 748.8 | 748.8 | 748.8 | 748.8 | 748.8 | 748.8 | 748.8 |
| 95 | 32.499 | 31.271 | 305.9 | 495.2 | 305.9 | 324.1 | 0 | 374.4 | 0 | 49.11 | 74.46 | 64.64 | 1141.6 | 756.9 | 756.9 | 756.9 | 756.9 | 756.9 | 756.9 | 756.9 |
| %SPAN | INCS DEGREE | INCH DEGREE | DEV DEGREE | TURN DEGREE | CAMBER DEGREE | OMEGA-B DEGREE | D-FAC DEGREE | OMEGA-B DEGREE | LOSS-P DEGREE | LOSS-P DEGREE | PO2/ DEGREE | EFF-P DEGREE | EFF-P DEGREE | EFF-P DEGREE | EFF-P DEGREE | EFF-P DEGREE | EFF-P DEGREE | EFF-P DEGREE | EFF-P DEGREE | EFF-P DEGREE |
| 5 | -3.28 | 3.15 | 14.99 | 35.27 | 47.12 | 0.000 | 0.3589 | 0.1124 | 0.0236 | 0.0236 | 1.3843 | 0.9173 | 0.9134 | 0.8307 | 0.8307 | 0.8307 | 0.8307 | 0.8307 | 0.8307 | 0.8307 |
| 10 | -2.68 | 3.55 | 12.60 | 30.87 | 39.95 | 0.000 | 0.3674 | 0.1490 | 0.0306 | 0.0306 | 1.3553 | 0.8822 | 0.8770 | 0.7937 | 0.7937 | 0.7937 | 0.7937 | 0.7937 | 0.7937 | 0.7937 |
| 15 | -2.41 | 3.64 | 11.11 | 26.89 | 34.37 | 0.001 | 0.3779 | 0.1495 | 0.0319 | 0.0319 | 1.3342 | 0.8641 | 0.8585 | 0.7867 | 0.7867 | 0.7867 | 0.7867 | 0.7867 | 0.7867 | 0.7867 |
| 30 | -2.66 | 3.49 | 8.07 | 19.81 | 24.29 | 0.010 | 0.3767 | 0.0958 | 0.0204 | 0.0204 | 1.3194 | 0.8893 | 0.8848 | 0.8474 | 0.8474 | 0.8474 | 0.8474 | 0.8474 | 0.8474 | 0.8474 |
| 50 | 2.93 | 5.78 | 5.82 | 14.93 | 14.66 | 0.046 | 0.3671 | 0.0713 | 0.0145 | 0.0145 | 1.3165 | 0.9015 | 0.8976 | 0.8743 | 0.8743 | 0.8743 | 0.8743 | 0.8743 | 0.8743 | 0.8743 |
| 70 | 8.33 | 10.28 | 5.64 | 14.26 | 8.95 | 0.162 | 0.3850 | 0.0829 | 0.0156 | 0.0156 | 1.3429 | 0.8841 | 0.8792 | 0.8470 | 0.8470 | 0.8470 | 0.8470 | 0.8470 | 0.8470 | 0.8470 |
| 85 | 10.00 | 11.31 | 7.03 | 11.97 | 7.77 | 0.176 | 0.4451 | 0.1820 | 0.0317 | 0.0317 | 1.3456 | 0.7580 | 0.7477 | 0.7002 | 0.7002 | 0.7002 | 0.7002 | 0.7002 | 0.7002 | 0.7002 |
| 90 | 10.02 | 11.15 | 7.70 | 10.87 | 7.46 | 0.181 | 0.4528 | 0.2048 | 0.0344 | 0.0344 | 1.3454 | 0.7305 | 0.7190 | 0.6711 | 0.6711 | 0.6711 | 0.6711 | 0.6711 | 0.6711 | 0.6711 |
| 95 | 10.22 | 11.16 | 8.67 | 9.81 | 7.34 | 0.206 | 0.4580 | 0.2229 | 0.0359 | 0.0359 | 1.3457 | 0.7084 | 0.6959 | 0.6484 | 0.6484 | 0.6484 | 0.6484 | 0.6484 | 0.6484 | 0.6484 |

TO/TO PO/PO EFF-P
INLET INLET INLET
1.1011 1.3295 83.87 85.05

STA-1 STA-2
---LOCAL---
8.0 9.0

Stator

| %SPAN | DIA-1 IN | DIA-2 IN | V-1 FT/SEC | V-2 FT/SEC | VM-1 FT/SEC | VM-2 FT/SEC | VO-1 FT/SEC | VO-2 FT/SEC | B-1 DEGREE | B-2 DEGREE | B-1-1 DEGREE | B-1-2 DEGREE | B-2-1 DEGREE | B-2-2 DEGREE | EFF-P FT/SEC | EFF-P FT/SEC | EFF-P FT/SEC | EFF-P FT/SEC | U-1 FT/SEC | U-2 FT/SEC |
|-------|----------------|----------------|---------------|----------------|------------------|-------------------|-----------------|-------------------|------------------|------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| 5 | 20.409 | 21.489 | 800.5 | 705.5 | 840.1 | 705.2 | 480.7 | 18.7 | 36.91 | 1.52 | 18.16 | 45.14 | 22.68 | 47.47 | 666.6 | 1007.4 | 1013.8 | 1013.8 | 1013.8 | 1013.8 |
| 10 | 21.008 | 21.961 | 784.1 | 682.2 | 824.8 | 682.1 | 454.1 | -4.5 | 36.45 | -0.05 | 22.68 | 47.47 | 22.68 | 47.47 | 666.6 | 1007.4 | 1013.8 | 1013.8 | 1013.8 | 1013.8 |
| 15 | 21.589 | 22.432 | 734.1 | 659.7 | 797.0 | 659.6 | 427.1 | -9.2 | 35.57 | -0.81 | 26.93 | 49.36 | 26.93 | 49.36 | 670.2 | 1013.8 | 1013.8 | 1013.8 | 1013.8 | 1013.8 |
| 30 | 23.314 | 23.902 | 690.1 | 622.6 | 783.5 | 622.6 | 368.3 | -9.8 | 32.25 | -0.90 | 35.76 | 52.74 | 35.76 | 52.74 | 719.9 | 1028.7 | 1028.7 | 1028.7 | 1028.7 | 1028.7 |
| 50 | 25.601 | 25.893 | 637.4 | 578.1 | 747.5 | 577.8 | 327.0 | -16.8 | 30.76 | -1.67 | 44.45 | 57.09 | 44.45 | 57.09 | 770.4 | 1063.9 | 1063.9 | 1063.9 | 1063.9 | 1063.9 |
| 70 | 27.818 | 27.902 | 604.5 | 533.7 | 708.0 | 533.5 | 327.4 | -11.3 | 32.80 | -1.20 | 50.40 | 60.82 | 50.40 | 60.82 | 797.1 | 1094.5 | 1094.5 | 1094.5 | 1094.5 | 1094.5 |
| 85 | 29.408 | 29.382 | 603.9 | 515.6 | 707.6 | 515.0 | 369.5 | 22.7 | 37.73 | 2.53 | 52.64 | 62.08 | 52.64 | 62.08 | 787.2 | 1099.7 | 1099.7 | 1099.7 | 1099.7 | 1099.7 |
| 90 | 29.914 | 29.856 | 605.6 | 505.9 | 712.7 | 504.5 | 378.4 | 38.4 | 38.68 | 4.36 | 53.29 | 62.57 | 53.29 | 62.57 | 790.8 | 1095.1 | 1095.1 | 1095.1 | 1095.1 | 1095.1 |
| 95 | 30.382 | 30.293 | 606.4 | 499.8 | 718.2 | 498.7 | 385.3 | 33.1 | 39.45 | 3.79 | 53.93 | 63.31 | 53.93 | 63.31 | 795.3 | 1110.4 | 1110.4 | 1110.4 | 1110.4 | 1110.4 |
| %SPAN | INCS DEGREE | INCH DEGREE | DEV DEGREE | TURN DEGREE | CAMBER DEGREE | OMEGA-B DEGREE | D-FAC DEGREE | OMEGA-B DEGREE | LOSS-P DEGREE | LOSS-P DEGREE | PO2/ DEGREE | EFF-P DEGREE | EFF-P DEGREE | EFF-P DEGREE | EFF-P DEGREE | EFF-P DEGREE | EFF-P DEGREE | EFF-P DEGREE | EFF-P DEGREE | EFF-P DEGREE |
| 5 | -9.16 | -6.24 | 13.92 | 35.39 | 55.88 | 0.000 | 0.2583 | 0.1059 | 0.0263 | 0.0263 | 0.9694 | 0.0000 | 0.9694 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 10 | -8.83 | -5.90 | 11.39 | 36.50 | 53.86 | 0.000 | 0.2558 | 0.0744 | 0.0195 | 0.0195 | 0.9796 | 0.0000 | 0.9796 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 15 | -8.91 | -5.97 | 10.19 | 36.38 | 52.49 | 0.000 | 0.2539 | 0.0592 | 0.0155 | 0.0155 | 0.9853 | 0.0000 | 0.9853 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 30 | -10.21 | -7.21 | 10.32 | 33.15 | 50.67 | 0.000 | 0.2496 | 0.0533 | 0.0155 | 0.0155 | 0.9876 | 0.0000 | 0.9876 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 50 | -9.99 | -6.87 | 10.37 | 32.43 | 49.61 | 0.000 | 0.2598 | 0.0367 | 0.0112 | 0.0112 | 0.9928 | 0.0000 | 0.9928 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 70 | -7.25 | -4.02 | 12.28 | 34.00 | 49.94 | 0.000 | 0.3027 | 0.0371 | 0.0123 | 0.0123 | 0.9935 | 0.0000 | 0.9935 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 85 | -1.84 | 1.47 | 18.44 | 35.20 | 52.04 | 0.000 | 0.3472 | 0.0622 | 0.0217 | 0.0217 | 0.9893 | 0.0000 | 0.9893 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 90 | -0.99 | 2.33 | 21.75 | 34.32 | 53.56 | 0.000 | 0.3643 | 0.0876 | 0.0310 | 0.0310 | 0.9850 | 0.0000 | 0.9850 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 95 | -0.23 | 3.13 | 23.48 | 35.66 | 56.02 | 0.000 | 0.3857 | 0.1011 | 0.0364 | 0.0364 | 0.9827 | 0.0000 | 0.9827 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

STA-1 STA-2
---LOCAL---
10.0 11.0

TABLE 12.3

BLADE-ELEMENT AND OVERALL PERFORMANCE WITH RADIAL INLET DISTORTION
70 PERCENT OF DESIGN SPEED

Rotor

| %SPAN | DIA-1 | | DIA-2 | | V-1 | | V-2 | | VM-1 | | VM-2 | | VO-1 | | VO-2 | | B-1 | | B-2 | | B-1-1 | | B-1-2 | | V-1-1 | | V-1-2 | | VO-1-1 | | VO-1-2 | | U-1 | | U-2 | | |
|-------|--------|--------|-------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---|
| | IN | OUT | IN | OUT | FT/SEC | DEGREE | FT/SEC | DEGREE | FT/SEC | DEGREE | FT/SEC | DEGREE | FT/SEC | DEGREE | FT/SEC | DEGREE | FT/SEC | DEGREE | FT/SEC | DEGREE | FT/SEC | DEGREE | FT/SEC | DEGREE | FT/SEC | DEGREE | FT/SEC | DEGREE | FT/SEC | DEGREE | FT/SEC | DEGREE | FT/SEC | DEGREE | FT/SEC | DEGREE | |
| 5 | 17.467 | 19.769 | 436.6 | 748.7 | 436.6 | 549.6 | 0 | 508.4 | 0 | 476.8 | 0 | 446.8 | 0 | 446.8 | 0 | 446.8 | 0 | 446.8 | 0 | 446.8 | 0 | 446.8 | 0 | 446.8 | 0 | 446.8 | 0 | 446.8 | 0 | 446.8 | 0 | 446.8 | 0 | 446.8 | 0 | 446.8 | 0 |
| 10 | 18.467 | 20.408 | 444.8 | 708.4 | 444.8 | 523.9 | 0 | 476.8 | 0 | 446.8 | 0 | 446.8 | 0 | 446.8 | 0 | 446.8 | 0 | 446.8 | 0 | 446.8 | 0 | 446.8 | 0 | 446.8 | 0 | 446.8 | 0 | 446.8 | 0 | 446.8 | 0 | 446.8 | 0 | 446.8 | 0 | 446.8 | 0 |
| 15 | 19.467 | 21.047 | 450.7 | 674.5 | 450.7 | 505.3 | 0 | 446.8 | 0 | 446.8 | 0 | 446.8 | 0 | 446.8 | 0 | 446.8 | 0 | 446.8 | 0 | 446.8 | 0 | 446.8 | 0 | 446.8 | 0 | 446.8 | 0 | 446.8 | 0 | 446.8 | 0 | 446.8 | 0 | 446.8 | 0 | 446.8 | 0 |
| 30 | 22.314 | 22.964 | 455.2 | 628.6 | 455.2 | 493.5 | 0 | 357.7 | 0 | 357.7 | 0 | 357.7 | 0 | 357.7 | 0 | 357.7 | 0 | 357.7 | 0 | 357.7 | 0 | 357.7 | 0 | 357.7 | 0 | 357.7 | 0 | 357.7 | 0 | 357.7 | 0 | 357.7 | 0 | 357.7 | 0 | 357.7 | 0 |
| 50 | 25.791 | 25.520 | 417.6 | 579.0 | 417.6 | 455.3 | 0 | 377.9 | 0 | 377.9 | 0 | 377.9 | 0 | 377.9 | 0 | 377.9 | 0 | 377.9 | 0 | 377.9 | 0 | 377.9 | 0 | 377.9 | 0 | 377.9 | 0 | 377.9 | 0 | 377.9 | 0 | 377.9 | 0 | 377.9 | 0 | 377.9 | 0 |
| 70 | 28.954 | 28.076 | 323.6 | 536.9 | 323.6 | 380.7 | 0 | 412.1 | 0 | 412.1 | 0 | 412.1 | 0 | 412.1 | 0 | 412.1 | 0 | 412.1 | 0 | 412.1 | 0 | 412.1 | 0 | 412.1 | 0 | 412.1 | 0 | 412.1 | 0 | 412.1 | 0 | 412.1 | 0 | 412.1 | 0 | 412.1 | 0 |
| 85 | 31.295 | 29.993 | 297.7 | 525.4 | 297.7 | 325.9 | 0 | 414.8 | 0 | 414.8 | 0 | 414.8 | 0 | 414.8 | 0 | 414.8 | 0 | 414.8 | 0 | 414.8 | 0 | 414.8 | 0 | 414.8 | 0 | 414.8 | 0 | 414.8 | 0 | 414.8 | 0 | 414.8 | 0 | 414.8 | 0 | 414.8 | 0 |
| 90 | 31.883 | 30.630 | 293.5 | 523.2 | 293.5 | 318.9 | 0 | 414.8 | 0 | 414.8 | 0 | 414.8 | 0 | 414.8 | 0 | 414.8 | 0 | 414.8 | 0 | 414.8 | 0 | 414.8 | 0 | 414.8 | 0 | 414.8 | 0 | 414.8 | 0 | 414.8 | 0 | 414.8 | 0 | 414.8 | 0 | 414.8 | 0 |
| 95 | 32.499 | 31.271 | 286.6 | 514.3 | 286.6 | 305.0 | 0 | 414.1 | 0 | 414.1 | 0 | 414.1 | 0 | 414.1 | 0 | 414.1 | 0 | 414.1 | 0 | 414.1 | 0 | 414.1 | 0 | 414.1 | 0 | 414.1 | 0 | 414.1 | 0 | 414.1 | 0 | 414.1 | 0 | 414.1 | 0 | 414.1 | 0 |

STA-1 STA-2
---LOCAL---

8.0 9.0

Stator

| %SPAN | DIA-1 | | DIA-2 | | V-1 | | V-2 | | VM-1 | | VM-2 | | VO-1 | | VO-2 | | B-1 | | B-2 | | B-1-1 | | B-1-2 | | V-1-1 | | V-1-2 | | VO-1-1 | | VO-1-2 | | U-1 | | U-2 | |
|-------|-------|-------|--------|--------|-------|-------|-------|--------|---------|-------|---------|--------|--------|--------|---------|-------|-------|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|--------|-------------|-------|-------|-------|-------|
| | IN | IN | FT/SEC | DEGREE | DEV | INCM | TURN | CAMBER | OMEGA-B | D-FAC | OMEGA-B | LOSS-P | LOSS-P | LOSS-P | PROFILE | PO2/ | PO1 | EFF-P | EFF-AD | EFF-P | EFF-P | EFF-P | EFF-P | EFF-P | EFF-P | EFF-P | EFF-P | EFF-P | EFF-P | EFF-P | EFF-P | EFF-P | EFF-P | EFF-P | EFF-P | |
| 5 | -7.31 | -4.39 | 14.47 | 36.70 | 55.88 | .0000 | .3076 | .1060 | .0263 | .0263 | .9703 | .0000 | .0000 | .0000 | .7048 | .6941 | .5778 | .5713 | .8463 | .8463 | .8463 | .8463 | .8463 | .8463 | .8463 | .8463 | .8463 | .8463 | .8463 | .8463 | .8463 | .8463 | .8463 | .8463 | .8463 | .8463 |
| 10 | -6.90 | -3.97 | 11.21 | 38.60 | 53.85 | .0000 | .3152 | .0848 | .0216 | .0216 | .9783 | .0000 | .0000 | .0000 | .7738 | .6575 | .5511 | .5645 | .8560 | .8560 | .8560 | .8560 | .8560 | .8560 | .8560 | .8560 | .8560 | .8560 | .8560 | .8560 | .8560 | .8560 | .8560 | .8560 | .8560 | .8560 |
| 15 | -6.82 | -3.88 | 10.07 | 38.57 | 52.50 | .0000 | .3128 | .0531 | .0154 | .0154 | .9860 | .0000 | .0000 | .0000 | .8305 | .6305 | .5307 | .5669 | .8588 | .8588 | .8588 | .8588 | .8588 | .8588 | .8588 | .8588 | .8588 | .8588 | .8588 | .8588 | .8588 | .8588 | .8588 | .8588 | .8588 | .8588 |
| 30 | -7.51 | -4.52 | 10.89 | 35.25 | 50.66 | .0000 | .3080 | .0477 | .0125 | .0125 | .9905 | .0000 | .0000 | .0000 | .8574 | .5926 | .5002 | .6048 | .8706 | .8706 | .8706 | .8706 | .8706 | .8706 | .8706 | .8706 | .8706 | .8706 | .8706 | .8706 | .8706 | .8706 | .8706 | .8706 | .8706 | .8706 |
| 50 | -6.45 | -3.33 | 10.93 | 35.57 | 49.60 | .0000 | .3305 | .0299 | .0092 | .0092 | .9305 | .0000 | .0000 | .0000 | .9313 | .5543 | .4840 | .6407 | .9030 | .9030 | .9030 | .9030 | .9030 | .9030 | .9030 | .9030 | .9030 | .9030 | .9030 | .9030 | .9030 | .9030 | .9030 | .9030 | .9030 | .9030 |
| 70 | -1.31 | 1.92 | 12.85 | 39.62 | 49.95 | .0001 | .4931 | .0378 | .0125 | .0125 | .9936 | .0000 | .0000 | .0000 | .9948 | .5237 | .4246 | .6405 | .9252 | .9252 | .9252 | .9252 | .9252 | .9252 | .9252 | .9252 | .9252 | .9252 | .9252 | .9252 | .9252 | .9252 | .9252 | .9252 | .9252 | .9252 |
| 85 | 4.42 | 7.74 | 19.53 | 40.27 | 52.04 | .0059 | .4404 | .0874 | .0305 | .0305 | .9851 | .0000 | .0000 | .0000 | .8228 | .5218 | .4062 | .6225 | .9198 | .9198 | .9198 | .9198 | .9198 | .9198 | .9198 | .9198 | .9198 | .9198 | .9198 | .9198 | .9198 | .9198 | .9198 | .9198 | .9198 | .9198 |
| 90 | 4.59 | 7.91 | 21.78 | 39.81 | 53.56 | .0053 | .4522 | .1065 | .0377 | .0377 | .9817 | .0000 | .0000 | .0000 | .7799 | .5261 | .4030 | .6318 | .9244 | .9244 | .9244 | .9244 | .9244 | .9244 | .9244 | .9244 | .9244 | .9244 | .9244 | .9244 | .9244 | .9244 | .9244 | .9244 | .9244 | |
| 95 | 4.86 | 8.23 | 23.39 | 40.81 | 56.01 | .0034 | .4639 | .1085 | .0391 | .0391 | .9815 | .0000 | .0000 | .0000 | .7628 | .5239 | .3996 | .6381 | .9378 | .9378 | .9378 | .9378 | .9378 | .9378 | .9378 | .9378 | .9378 | .9378 | .9378 | .9378 | .9378 | .9378 | .9378 | .9378 | .9378 | |
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TABLE 13.1

BLADE-ELEMENT AND OVERALL PERFORMANCE WITH RADIAL INLET DISTORTION
88 PERCENT OF DESIGN SPEED

Rotor

| | DIA-1 | DIA-2 | V-1 | V-2 | VM-1 | VM-2 | VO-1 | VO-2 | B-1 | B-2 | B*-1 | B*-2 | V*-1 | V*-2 | VO*-1 | VO*-2 | U-1 | U-2 |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|--------|--------|--------|
| %SPAN | IN | IN | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | DEGREE | DEGREE | DEGREE | DEGREE | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC |
| 5 | 17.467 | 19.769 | 595.1 | 927.5 | 595.1 | 691.0 | .0 | 618.7 | .00 | 41.84 | 51.31 | 17.84 | 952.0 | 726.0 | -743.1 | -222.4 | 743.1 | 811.1 |
| 10 | 18.467 | 20.408 | 613.3 | 885.9 | 613.3 | 669.2 | .0 | 580.5 | .00 | 40.94 | 52.02 | 23.27 | 996.7 | 725.9 | -785.7 | -287.7 | 785.7 | 868.3 |
| 15 | 19.467 | 21.047 | 630.9 | 847.6 | 630.9 | 645.8 | .0 | 549.0 | .00 | 40.36 | 52.69 | 28.19 | 1041.2 | 733.6 | -828.2 | -346.4 | 828.2 | 895.4 |
| 30 | 22.314 | 22.964 | 646.0 | 771.4 | 646.0 | 612.5 | .0 | 468.9 | .00 | 37.42 | 55.74 | 39.62 | 1148.5 | 796.4 | -949.3 | -508.1 | 949.3 | 971.0 |
| 50 | 25.791 | 25.520 | 607.7 | 725.6 | 607.7 | 592.3 | .0 | 419.1 | .00 | 35.29 | 61.00 | 48.35 | 1254.7 | 892.3 | -1097.3 | -666.7 | 1097.3 | 1085.7 |
| 70 | 28.954 | 28.076 | 506.1 | 662.3 | 506.1 | 522.4 | .0 | 406.8 | .00 | 37.92 | 67.65 | 56.44 | 1332.2 | 945.4 | -1231.8 | -787.7 | 1231.8 | 1194.9 |
| 85 | 31.295 | 29.993 | 482.2 | 642.0 | 482.2 | 467.4 | .0 | 440.1 | .00 | 43.27 | 70.85 | 60.79 | 1409.4 | 957.8 | -1331.4 | -835.9 | 1331.4 | 1276.0 |
| 90 | 31.883 | 30.630 | 453.5 | 652.2 | 453.5 | 469.8 | .0 | 452.1 | .00 | 43.91 | 71.51 | 61.10 | 1430.3 | 971.0 | -1356.5 | -851.0 | 1356.5 | 1305.1 |
| 95 | 32.499 | 31.271 | 442.7 | 638.3 | 442.7 | 431.2 | .0 | 470.6 | .00 | 47.50 | 72.25 | 63.37 | 1451.8 | 961.9 | -1382.7 | -859.8 | 1382.7 | 1330.4 |

| | INCS | INCM | DEV | TURN | CAMBER | OMEGA-B | D-FAC | OMEGA-B | LOSS-P | LOSS-P | PO2/ | EFF-P | EFF-AD | EFF-P | M-1 | M-2 | M*-1 | M*-2 |
|-------|--------|--------|--------|--------|--------|---------|-------|---------|---------|---------|--------|-------|--------|--------|-------|-------|--------|-------|
| %SPAN | DEGREE | DEGREE | DEGREE | DEGREE | SHOCK | SHOCK | | | PROFILE | PROFILE | PO1 | TOTAL | TOTAL | STATIC | | | | |
| 5 | -4.10 | 2.33 | 15.97 | 33.47 | 47.12 | .0013 | .3889 | .1106 | .0231 | .0229 | 1.6460 | .9217 | .9158 | .8627 | .5493 | .8189 | .8795 | .8410 |
| 10 | -4.04 | 2.39 | 13.59 | 28.75 | 39.94 | .0020 | .4091 | .1398 | .0295 | .0291 | 1.5953 | .8899 | .8823 | .8315 | .5679 | .7796 | .9237 | .8415 |
| 15 | -3.94 | 2.13 | 11.85 | 24.50 | 34.21 | .0028 | .4268 | .1687 | .0357 | .0351 | 1.5485 | .8528 | .8435 | .8003 | .5840 | .7436 | .9640 | .8435 |
| 30 | -2.46 | 1.71 | 10.01 | 16.12 | 24.32 | .0093 | .4178 | .1469 | .0304 | .0285 | 1.4960 | .8391 | .8298 | .8158 | .5992 | .6738 | 1.0563 | .8756 |
| 50 | .86 | 3.77 | 6.11 | 12.65 | 14.63 | .0248 | .3901 | .0798 | .0162 | .0113 | 1.5354 | .8986 | .8923 | .8859 | .5698 | .6308 | 1.1463 | .7157 |
| 70 | 5.48 | 7.46 | 5.77 | 11.20 | 8.92 | .0528 | .3924 | .0643 | .0121 | .0024 | 1.5911 | .9149 | .9091 | .9013 | .4805 | .5694 | 1.2097 | .8128 |
| 85 | 7.43 | 8.77 | 6.41 | 10.06 | 7.72 | .0701 | .4317 | .1390 | .0247 | .0123 | 1.6147 | .8259 | .8135 | .7984 | .4271 | .5449 | 1.2702 | .8129 |
| 90 | 7.61 | 8.75 | 5.76 | 10.41 | 7.39 | .0751 | .4350 | .1948 | .0277 | .0147 | 1.6354 | .8113 | .7975 | .7787 | .4170 | .5519 | 1.2937 | .8226 |
| 95 | 7.98 | 8.92 | 7.38 | 8.88 | 7.32 | .0833 | .4571 | .1931 | .0336 | .0197 | 1.6316 | .7638 | .7468 | .7282 | .4048 | .5366 | 1.3158 | .8087 |

TO/TO PO/PO EFF-AD EFF-P
INLET INLET INLET INLET
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| | DIA-1 | DIA-2 | V-1 | V-2 | VM-1 | VM-2 | VO-1 | VO-2 | B-1 | B-2 | B*-1 | B*-2 | V*-1 | V*-2 | VO*-1 | VO*-2 | U-1 | U-2 |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|--------|--------|
| %SPAN | IN | IN | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | DEGREE | DEGREE | DEGREE | DEGREE | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC | FT/SEC |
| 5 | 20.409 | 21.489 | 990.9 | 914.6 | 788.8 | 913.1 | 599.6 | -51.4 | 37.24 | -3.22 | 18.81 | 46.60 | 833.4 | 1329.1 | -268.7 | -965.7 | 868.3 | 914.2 |
| 10 | 21.008 | 21.961 | 950.9 | 896.8 | 765.1 | 896.3 | 564.6 | -28.2 | 36.42 | -1.80 | 23.28 | 47.03 | 833.3 | 1315.3 | -329.2 | -962.6 | 893.8 | 934.3 |
| 15 | 21.589 | 22.432 | 914.7 | 878.0 | 741.4 | 877.9 | 535.7 | -14.7 | 35.84 | -.96 | 27.30 | 47.83 | 834.9 | 1307.7 | -382.8 | -969.0 | 918.5 | 954.4 |
| 30 | 23.314 | 23.902 | 845.4 | 821.6 | 707.9 | 821.5 | 462.0 | -13.1 | 33.12 | -.92 | 36.78 | 51.42 | 884.6 | 1317.6 | -529.9 | -1030.0 | 991.9 | 1016.9 |
| 50 | 25.601 | 25.893 | 812.2 | 794.3 | 696.8 | 793.9 | 417.3 | -29.7 | 30.92 | -1.86 | 43.94 | 54.84 | 968.3 | 1378.9 | -671.9 | -1127.3 | 1089.2 | 1101.6 |
| 70 | 27.818 | 27.902 | 775.4 | 752.3 | 658.9 | 751.4 | 408.6 | -34.9 | 31.80 | -2.66 | 49.82 | 58.41 | 1017.2 | 1434.6 | -774.9 | -1222.0 | 1183.5 | 1187.1 |
| 85 | 29.408 | 29.382 | 783.0 | 727.2 | 641.7 | 727.1 | 448.7 | 2.1 | 34.96 | .16 | 51.35 | 59.77 | 1027.5 | 1444.4 | -802.5 | -1248.0 | 1251.2 | 1250.1 |
| 90 | 29.914 | 29.856 | 801.3 | 732.0 | 652.9 | 731.5 | 464.4 | 26.5 | 35.42 | 2.07 | 51.07 | 59.54 | 1039.1 | 1442.9 | -808.3 | -1243.7 | 1272.7 | 1270.2 |
| 95 | 30.382 | 30.293 | 801.2 | 723.0 | 637.8 | 722.4 | 484.9 | 30.7 | 37.24 | 2.44 | 51.70 | 60.14 | 1029.2 | 1450.7 | -807.7 | -1258.1 | 1292.6 | 1288.8 |

| | INCS | INCM | DEV | TURN | CAMBER | OMEGA-B | D-FAC | OMEGA-B | LOSS-P | LOSS-P | PO2/ | EFF-P | EFF-AD | EFF-P | M-1 | M-2 | M*-1 | M*-2 |
|-------|--------|--------|--------|--------|--------|---------|-------|---------|---------|---------|-------|-------|--------|---------|-------|-------|-------|--------|
| %SPAN | DEGREE | DEGREE | DEGREE | DEGREE | SHOCK | SHOCK | | | PROFILE | PROFILE | PO1 | TOTAL | TOTAL | STATIC | | | | |
| 5 | -9.00 | -6.08 | 9.18 | 40.46 | 55.88 | .0000 | .2368 | .2381 | .0591 | .0591 | .9052 | .0000 | .0000 | -.2484 | .8774 | .8061 | .7812 | 1.1119 |
| 10 | -8.57 | -5.94 | 9.64 | 38.22 | 53.84 | .0000 | .2127 | .1980 | .0505 | .0505 | .9261 | .0000 | .0000 | -.4075 | .8413 | .7904 | .7397 | 1.1595 |
| 15 | -8.57 | -5.63 | 9.95 | 36.80 | 52.38 | .0000 | .1944 | .1628 | .0426 | .0426 | .9429 | .0000 | .0000 | -.6391 | .8090 | .7733 | .7392 | 1.1517 |
| 30 | -9.31 | -6.32 | 10.30 | 34.04 | 50.67 | .0000 | .1839 | .1431 | .0402 | .0402 | .9559 | .0000 | .0000 | -1.0988 | .7453 | .7220 | .7195 | 1.1579 |
| 50 | -9.82 | -6.70 | 10.18 | 32.77 | 49.60 | .0000 | .1883 | .1345 | .0412 | .0412 | .9613 | .0000 | .0000 | -1.5999 | .7144 | .6961 | .8493 | 1.2084 |
| 70 | -7.99 | -4.76 | 10.82 | 34.46 | 49.91 | .0000 | .2192 | .1436 | .0475 | .0475 | .9622 | .0000 | .0000 | -1.2425 | .6751 | .6533 | .8855 | 1.2459 |
| 85 | -4.46 | -1.14 | 16.07 | 34.80 | 52.01 | .0000 | .2708 | .2130 | .0745 | .0745 | .9441 | .0000 | .0000 | -.3389 | .6733 | .6226 | .8841 | 1.2566 |
| 90 | -4.24 | -.91 | 19.47 | 33.35 | 53.54 | .0001 | .2809 | .2340 | .0831 | .0831 | .9364 | .0000 | .0000 | -.2260 | .6889 | .6245 | .8948 | 1.2310 |
| 95 | -2.51 | .86 | 22.13 | 34.81 | 56.00 | .0002 | .3024 | .2479 | .0893 | .0893 | .9332 | .0000 | .0000 | -.1508 | .6852 | .6130 | .8798 | 1.2299 |

STA-1 STA-2
---LOCAL---

10.0

11.0

TABLE 13.2

BLADE-ELEMENT AND OVERALL PERFORMANCE WITH RADIAL INLET DISTORTION
88 PERCENT OF DESIGN SPEED

Rotor

| % SPAN | DIA-1 IN | DIA-2 IN | V-1 FT/SEC | V-2 FT/SEC | VM-1 FT/SEC | VM-2 FT/SEC | V0-1 FT/SEC | V0-2 FT/SEC | B-1 DEGREE | B-2 DEGREE | B*-1 DEGREE | B*-2 DEGREE | V*-1 FT/SEC | V*-2 FT/SEC | V0*-1 FT/SEC | V0*-2 FT/SEC | U-1 FT/SEC | U-2 FT/SEC |
|--------|-------------|-------------|---------------|---------------|----------------|----------------|----------------|----------------|---------------|---------------|----------------|----------------|----------------|----------------|-----------------|-----------------|---------------|---------------|
| 5 | 17.467 | 19.769 | 579.2 | 579.2 | 579.2 | 579.2 | 652.9 | 652.9 | 0.00 | 630.4 | 0.00 | 44.00 | 52.02 | 17.79 | 941.3 | 685.7 | 742.0 | 742.0 |
| 10 | 18.467 | 20.408 | 597.2 | 597.2 | 597.2 | 597.2 | 626.9 | 626.9 | 0.00 | 594.0 | 0.00 | 43.45 | 52.72 | 23.53 | 986.0 | 684.5 | 743.0 | 743.0 |
| 15 | 19.467 | 21.047 | 614.8 | 614.8 | 614.8 | 614.8 | 603.3 | 603.3 | 0.00 | 557.9 | 0.00 | 42.65 | 53.36 | 29.00 | 1030.6 | 693.1 | 753.0 | 753.0 |
| 30 | 22.314 | 22.964 | 629.7 | 629.7 | 629.7 | 629.7 | 604.2 | 604.2 | 0.00 | 487.7 | 0.00 | 38.91 | 56.39 | 38.88 | 1138.2 | 777.0 | 848.0 | 848.0 |
| 50 | 25.791 | 25.520 | 588.4 | 588.4 | 588.4 | 588.4 | 565.1 | 565.1 | 0.00 | 455.0 | 0.00 | 38.85 | 61.74 | 48.05 | 1244.0 | 846.3 | 948.0 | 948.0 |
| 70 | 28.954 | 28.076 | 492.1 | 492.1 | 492.1 | 492.1 | 489.2 | 489.2 | 0.00 | 450.6 | 0.00 | 42.65 | 68.18 | 56.60 | 1325.2 | 889.0 | 1095.0 | 1095.0 |
| 85 | 31.295 | 29.993 | 446.4 | 446.4 | 446.4 | 446.4 | 438.7 | 438.7 | 0.00 | 487.8 | 0.00 | 47.20 | 71.44 | 60.12 | 1402.5 | 906.9 | 1239.5 | 1239.5 |
| 90 | 31.883 | 30.630 | 437.7 | 437.7 | 437.7 | 437.7 | 438.6 | 438.6 | 0.00 | 502.1 | 0.00 | 48.87 | 72.09 | 61.24 | 1423.4 | 911.6 | 1354.5 | 1354.5 |
| 95 | 32.499 | 31.271 | 427.9 | 427.9 | 427.9 | 427.9 | 400.9 | 400.9 | 0.00 | 515.7 | 0.00 | 52.14 | 72.78 | 63.75 | 1445.4 | 906.3 | 1380.6 | 1380.6 |

| % SPAN | INCS DEGREE | INCM DEGREE | DEV DEGREE | TURN DEGREE | CAMBER DEGREE | OMEGA-B DEGREE | D-FAC DEGREE | OMEGA-B DEGREE | LOSS-P TOTAL | PO2/ PO1 | EFF-P TOTAL | EFF-AD TOTAL | EFF-P TOTAL | EFF-AD TOTAL | M-1 | M-2 | M*-1 | M*-2 |
|--------|----------------|----------------|---------------|----------------|------------------|-------------------|-----------------|-------------------|-----------------|-------------|----------------|-----------------|----------------|-----------------|--------|--------|--------|--------|
| 5 | -3.39 | 3.04 | 15.92 | 34.24 | 47.12 | 427.6 | 0.017 | 427.6 | 1.073 | 0.024 | 0.021 | 1.6638 | 0.9266 | 0.9210 | 0.8768 | 0.8768 | 0.8768 | 0.8768 |
| 10 | -3.34 | 3.09 | 13.85 | 29.19 | 39.95 | 451.1 | 0.025 | 451.1 | 1.422 | 0.030 | 0.024 | 1.6123 | 0.8921 | 0.8845 | 0.8413 | 0.8413 | 0.8413 | 0.8413 |
| 15 | -3.29 | 2.82 | 12.58 | 24.37 | 34.14 | 462.3 | 0.034 | 462.3 | 1.624 | 0.034 | 0.034 | 1.5637 | 0.8625 | 0.8536 | 0.8136 | 0.8136 | 0.8136 | 0.8136 |
| 30 | -1.83 | 2.34 | 9.26 | 17.51 | 24.31 | 434.1 | 0.099 | 434.1 | 1.056 | 0.021 | 0.020 | 1.5570 | 0.8902 | 0.8832 | 0.8707 | 0.8707 | 0.8707 | 0.8707 |
| 50 | 1.64 | 4.53 | 5.81 | 13.69 | 14.64 | 430.6 | 0.257 | 430.6 | 0.806 | 0.016 | 0.013 | 1.5937 | 0.9058 | 0.8994 | 0.8926 | 0.8926 | 0.8926 | 0.8926 |
| 70 | 6.10 | 8.06 | 5.94 | 11.58 | 8.94 | 442.8 | 0.358 | 442.8 | 0.890 | 0.166 | 0.067 | 1.6539 | 0.8861 | 0.8769 | 0.8647 | 0.8647 | 0.8647 | 0.8647 |
| 85 | 8.00 | 9.33 | 5.76 | 11.31 | 7.74 | 477.2 | 0.715 | 477.2 | 1.510 | 0.274 | 0.146 | 1.6947 | 0.8283 | 0.8150 | 0.7967 | 0.7967 | 0.7967 | 0.7967 |
| 90 | 8.20 | 9.34 | 5.92 | 10.85 | 7.41 | 487.5 | 0.765 | 487.5 | 1.778 | 0.317 | 0.185 | 1.7076 | 0.8027 | 0.7874 | 0.7666 | 0.7666 | 0.7666 | 0.7666 |
| 95 | 8.53 | 9.47 | 7.77 | 9.03 | 7.33 | 504.7 | 0.846 | 504.7 | 2.143 | 0.357 | 0.217 | 1.7041 | 0.7660 | 0.7478 | 0.7277 | 0.7277 | 0.7277 | 0.7277 |

To/To PO/PO EFF-AD EFF-P
INLET INLET INLET INLET

1.1707 1.6058 84.82 86.49

STA-1 STA-2
---LOCAL---

8.0 9.0

Stator

| % SPAN | DIA-1 IN | DIA-2 IN | V-1 FT/SEC | V-2 FT/SEC | VM-1 FT/SEC | VM-2 FT/SEC | V0-1 FT/SEC | V0-2 FT/SEC | B-1 DEGREE | B-2 DEGREE | B*-1 DEGREE | B*-2 DEGREE | V*-1 FT/SEC | V*-2 FT/SEC | V0*-1 FT/SEC | V0*-2 FT/SEC | U-1 FT/SEC | U-2 FT/SEC |
|--------|-------------|-------------|---------------|---------------|----------------|----------------|----------------|----------------|---------------|---------------|----------------|----------------|----------------|----------------|-----------------|-----------------|---------------|---------------|
| 5 | 20.409 | 21.489 | 961.8 | 961.8 | 961.8 | 961.8 | 610.7 | 610.7 | 1.66 | 39.41 | 1.66 | 19.03 | 48.61 | 786.1 | 1186.6 | 256.4 | 890.2 | 890.2 |
| 10 | 21.008 | 21.961 | 920.2 | 920.2 | 920.2 | 920.2 | 577.7 | 577.7 | 1.43 | 38.89 | 1.43 | 23.73 | 50.57 | 782.7 | 1200.4 | 314.7 | 927.1 | 927.1 |
| 15 | 21.589 | 22.432 | 881.6 | 881.6 | 881.6 | 881.6 | 544.3 | 544.3 | 1.25 | 38.12 | 1.25 | 28.24 | 52.28 | 787.8 | 1209.0 | 372.9 | 956.2 | 956.2 |
| 30 | 23.314 | 23.902 | 838.9 | 838.9 | 838.9 | 838.9 | 480.3 | 480.3 | 1.14 | 34.92 | 1.11 | 36.54 | 55.30 | 856.7 | 1236.7 | 510.2 | 1016.8 | 1016.8 |
| 50 | 25.601 | 25.893 | 800.0 | 800.0 | 800.0 | 800.0 | 452.7 | 452.7 | 1.08 | 34.47 | 0.92 | 43.89 | 58.63 | 915.8 | 1301.0 | 634.9 | 1110.8 | 1110.8 |
| 70 | 27.818 | 27.902 | 762.4 | 762.4 | 762.4 | 762.4 | 431.9 | 431.9 | 0.88 | 36.41 | 0.80 | 49.93 | 62.12 | 953.0 | 1351.1 | 729.3 | 1194.2 | 1194.2 |
| 85 | 29.408 | 29.382 | 785.4 | 785.4 | 785.4 | 785.4 | 425.3 | 425.3 | 2.70 | 51.05 | 2.70 | 51.05 | 62.84 | 967.2 | 1369.8 | 752.2 | 1218.7 | 1218.7 |
| 90 | 29.914 | 29.856 | 796.6 | 796.6 | 796.6 | 796.6 | 417.9 | 417.9 | 5.40 | 51.20 | 5.40 | 51.20 | 62.58 | 969.9 | 1362.1 | 759.9 | 1209.1 | 1209.1 |
| 95 | 30.382 | 30.293 | 795.0 | 795.0 | 795.0 | 795.0 | 417.9 | 417.9 | 4.45 | 52.09 | 4.45 | 52.09 | 63.61 | 962.7 | 1383.2 | 759.6 | 1239.1 | 1239.1 |

| % SPAN | INCS DEGREE | INCM DEGREE | DEV DEGREE | TURN DEGREE | CAMBER DEGREE | OMEGA-B DEGREE | D-FAC DEGREE | OMEGA-B DEGREE | LOSS-P TOTAL | PO2/ PO1 | EFF-P TOTAL | EFF-AD TOTAL | EFF-P TOTAL | EFF-AD TOTAL | M-1 | M-2 | M*-1 | M*-2 |
|--------|----------------|----------------|---------------|----------------|------------------|-------------------|-----------------|-------------------|-----------------|-------------|----------------|-----------------|----------------|-----------------|--------|--------|--------|--------|
| 5 | -6.70 | -3.78 | 14.06 | 37.76 | 55.88 | 0.000 | 0.000 | 0.000 | 1.250 | 0.031 | 0.031 | 1.9527 | 0.000 | 0.000 | 0.7075 | 0.7075 | 0.7075 | 0.7075 |
| 10 | -6.37 | -3.44 | 11.87 | 38.46 | 53.66 | 0.000 | 0.000 | 0.000 | 0.862 | 0.020 | 0.020 | 1.9697 | 0.000 | 0.000 | 0.7094 | 0.7094 | 0.7094 | 0.7094 |
| 15 | -6.36 | -3.42 | 10.71 | 38.37 | 52.44 | 0.000 | 0.000 | 0.000 | 0.509 | 0.033 | 0.033 | 1.9833 | 0.000 | 0.000 | 0.8723 | 0.8723 | 0.8723 | 0.8723 |
| 30 | -7.52 | -4.52 | 11.11 | 35.03 | 50.67 | 0.000 | 0.000 | 0.000 | 0.581 | 0.063 | 0.063 | 1.9824 | 0.000 | 0.000 | 0.8374 | 0.8374 | 0.8374 | 0.8374 |
| 50 | -6.30 | -3.17 | 11.12 | 35.39 | 49.61 | 0.000 | 0.000 | 0.000 | 0.411 | 0.126 | 0.126 | 1.9886 | 0.000 | 0.000 | 0.8582 | 0.8582 | 0.8582 | 0.8582 |
| 70 | -3.42 | -1.19 | 12.67 | 37.21 | 49.91 | 0.005 | 0.005 | 0.005 | 0.436 | 0.145 | 0.145 | 1.9890 | 0.000 | 0.000 | 0.9155 | 0.9155 | 0.9155 | 0.9155 |
| 85 | -2.54 | 3.08 | 18.60 | 36.57 | 52.01 | 0.034 | 0.034 | 0.034 | 1.1073 | 0.375 | 0.363 | 1.9721 | 0.000 | 0.000 | 0.7703 | 0.7703 | 0.7703 | 0.7703 |
| 90 | -2.44 | 3.86 | 24.80 | 34.88 | 53.55 | 0.045 | 0.045 | 0.045 | 1.1199 | 0.426 | 0.426 | 1.9682 | 0.000 | 0.000 | 0.7543 | 0.7543 | 0.7543 | 0.7543 |
| 95 | 2.16 | 5.53 | 22.14 | 37.47 | 56.01 | 0.056 | 0.056 | 0.056 | 1.1393 | 0.501 | 0.481 | 1.9655 | 0.000 | 0.000 | 0.7094 | 0.7094 | 0.7094 | 0.7094 |

STA-1 STA-2
---LOCAL---

10.0 11.0

TABLE 13.3

BLADE-ELEMENT AND OVERALL PERFORMANCE WITH RADIAL INLET DISTORTION
88 PERCENT OF DESIGN SPEED

Rotor

| %SPAN | DIA-1 IN | DIA-2 IN | V-1 FT/SEC | V-2 FT/SEC | VM-1 FT/SEC | VM-2 FT/SEC | V0-1 FT/SEC | V0-2 FT/SEC | B-1 DEGREE | B-2 DEGREE | B1-1 DEGREE | B1-2 DEGREE | V1-1 FT/SEC | V1-2 FT/SEC | V01-1 FT/SEC | V01-2 FT/SEC | U-1 FT/SEC | U-2 FT/SEC |
|-------|-------------|-------------|---------------|---------------|----------------|----------------|----------------|----------------|---------------|---------------|----------------|----------------|----------------|----------------|-----------------|-----------------|---------------|---------------|
| 5 | 17.467 | 19.769 | 566.5 | 903.9 | 566.5 | 641.8 | .0 | 636.4 | .00 | 44.76 | 52.65 | 17.62 | 933.9 | 673.5 | 742.4 | 203.8 | 742.4 | 840.2 |
| 10 | 18.467 | 20.408 | 584.2 | 860.2 | 584.2 | 616.5 | .0 | 600.0 | .00 | 44.22 | 53.34 | 23.46 | 978.4 | 672.7 | 784.9 | 267.4 | 784.9 | 867.4 |
| 15 | 19.467 | 21.047 | 601.3 | 819.8 | 601.3 | 594.6 | .0 | 564.2 | .00 | 43.48 | 53.98 | 29.00 | 1022.8 | 661.0 | 827.4 | 330.4 | 827.4 | 894.6 |
| 30 | 22.314 | 22.964 | 614.5 | 774.7 | 614.5 | 597.4 | .0 | 493.2 | .00 | 39.54 | 57.04 | 38.90 | 1130.2 | 768.6 | 848.4 | 482.8 | 948.4 | 976.0 |
| 50 | 25.791 | 25.520 | 571.9 | 726.6 | 571.9 | 555.7 | .0 | 468.0 | .00 | 40.12 | 62.42 | 47.96 | 1236.7 | 830.7 | 1096.2 | 616.7 | 1036.2 | 1084.7 |
| 70 | 28.954 | 28.076 | 471.7 | 674.9 | 471.7 | 470.2 | .0 | 483.8 | .00 | 45.82 | 69.01 | 56.46 | 1318.3 | 851.4 | 1230.6 | 709.5 | 1230.6 | 1193.3 |
| 85 | 31.295 | 29.993 | 427.1 | 670.0 | 427.1 | 420.4 | .0 | 521.6 | .00 | 51.13 | 72.18 | 60.83 | 1397.0 | 862.6 | 1330.1 | 753.2 | 1330.1 | 1274.8 |
| 90 | 31.883 | 30.630 | 418.9 | 667.8 | 418.9 | 404.1 | .0 | 531.6 | .00 | 52.76 | 72.82 | 62.31 | 1418.4 | 869.9 | 1355.1 | 770.2 | 1355.1 | 1301.9 |
| 95 | 32.499 | 31.271 | 409.4 | 660.3 | 409.4 | 386.5 | .0 | 535.4 | .00 | 54.18 | 73.49 | 64.04 | 1440.7 | 882.8 | 1381.3 | 793.7 | 1381.3 | 1329.1 |

Stator

| %SPAN | INCS DEGREE | INCM DEGREE | DEV DEGREE | TURN DEGREE | CAMBER DEGREE | OMEGA-B SHOCK | D-FAC SHOCK | OMEGA-B LOSS-P | OMEGA-B LOSS-P | OMEGA-B LOSS-P | OMEGA-B LOSS-P | OMEGA-B LOSS-P | OMEGA-B LOSS-P | OMEGA-B LOSS-P | OMEGA-B LOSS-P | OMEGA-B LOSS-P | OMEGA-B LOSS-P | OMEGA-B LOSS-P |
|-------|----------------|----------------|---------------|----------------|------------------|------------------|----------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| 5 | -2.76 | 3.67 | 15.75 | 35.03 | 47.12 | .0022 | 4.377 | .0911 | .0191 | .0186 | 1.6832 | .9390 | .9342 | .8971 | .5215 | .7937 | .8603 | .5913 |
| 10 | -2.73 | 3.70 | 13.78 | 29.88 | 39.94 | .0031 | 4.603 | .1266 | .0267 | .0260 | 1.6321 | .9062 | .8993 | .8607 | .5392 | .7526 | .8038 | .5885 |
| 15 | -2.65 | 3.42 | 12.67 | 24.98 | 34.23 | .0041 | 4.716 | .1486 | .0312 | .0303 | 1.5855 | .8773 | .8691 | .8371 | .5547 | .7152 | .7435 | .5441 |
| 30 | -1.13 | 3.02 | 9.27 | 18.14 | 24.30 | .0108 | 4.389 | .0900 | .0188 | .0166 | 1.5790 | .9084 | .9024 | .8901 | .5881 | .6745 | 1.0371 | .6692 |
| 50 | 2.43 | 5.26 | 5.71 | 14.46 | 14.65 | .0273 | 4.431 | .0848 | .0173 | .0118 | 1.6129 | .9044 | .8977 | .8888 | .5325 | .6269 | 1.1292 | .7188 |
| 70 | -7.04 | 8.97 | 5.83 | 12.55 | 8.98 | .0565 | 4.769 | .1268 | .0238 | .0134 | 1.6684 | .8598 | .8490 | .8335 | .4823 | .5733 | 1.1953 | .7232 |
| 85 | 8.78 | 10.10 | 6.49 | 11.37 | 7.77 | .0746 | 5.154 | .1941 | .0344 | .0215 | 1.7092 | .7914 | .7752 | .7510 | .3933 | .5619 | 1.2577 | .7234 |
| 90 | 8.95 | 10.08 | 7.02 | 10.51 | 7.44 | .0796 | 5.227 | .2169 | .0373 | .0239 | 1.7178 | .7704 | .7523 | .7270 | .3835 | .5578 | 1.2806 | .7266 |
| 95 | 9.24 | 10.18 | 8.06 | 9.45 | 7.33 | .0878 | 5.244 | .2321 | .0382 | .0239 | 1.7223 | .7549 | .7355 | .7106 | .3732 | .5497 | 1.3029 | .7049 |

TO/TO PO/PO EFF-AD EFF-P
INLET INLET INLET INLET
1.1766 1.6257 84.27 85.97

STA-1 STA-2
---LOCAL---

Stator

| %SPAN | DIA-1 IN | DIA-2 IN | V-1 FT/SEC | V-2 FT/SEC | VM-1 FT/SEC | VM-2 FT/SEC | V0-1 FT/SEC | V0-2 FT/SEC | B-1 DEGREE | B-2 DEGREE | B1-1 DEGREE | B1-2 DEGREE | V1-1 FT/SEC | V1-2 FT/SEC | V01-1 FT/SEC | V01-2 FT/SEC | U-1 FT/SEC | U-2 FT/SEC |
|-------|-------------|-------------|---------------|---------------|----------------|----------------|----------------|----------------|---------------|---------------|----------------|----------------|----------------|----------------|-----------------|-----------------|---------------|---------------|
| 5 | 20.409 | 21.489 | 952.6 | 753.1 | 726.2 | 752.9 | 616.5 | 17.1 | 40.33 | 1.30 | 19.06 | 49.97 | 768.4 | 1170.5 | 250.9 | 896.2 | 867.4 | 913.3 |
| 10 | 21.008 | 21.961 | 911.0 | 729.4 | 699.5 | 729.4 | 583.5 | 3.4 | 39.83 | .26 | 23.86 | 51.89 | 765.4 | 1182.1 | 309.3 | 930.0 | 892.9 | 933.4 |
| 15 | 21.589 | 22.432 | 871.9 | 706.6 | 676.1 | 706.5 | 550.4 | -3.6 | 39.14 | -3.30 | 28.47 | 53.56 | 769.9 | 1189.8 | 367.2 | 957.1 | 917.6 | 953.4 |
| 30 | 23.314 | 23.902 | 830.3 | 675.3 | 673.4 | 675.3 | 485.6 | -4.4 | 35.79 | -0.04 | 36.85 | 56.39 | 842.3 | 1230.3 | 505.3 | 1016.3 | 990.9 | 1015.9 |
| 50 | 25.601 | 25.893 | 792.8 | 643.6 | 642.2 | 645.6 | 464.8 | -6.1 | 35.90 | -5.4 | 44.14 | 59.73 | 895.3 | 1281.3 | 623.3 | 1106.6 | 1088.1 | 1100.9 |
| 70 | 27.818 | 27.902 | 761.3 | 601.0 | 586.8 | 601.0 | 484.8 | -5.1 | 39.36 | -4.8 | 49.93 | 63.22 | 911.5 | 1334.1 | 697.5 | 1191.0 | 1182.3 | 1185.9 |
| 85 | 29.408 | 29.382 | 778.1 | 585.5 | 568.6 | 585.8 | 531.1 | 27.1 | 43.05 | 2.64 | 51.65 | 64.27 | 916.5 | 1356.2 | 718.8 | 1221.7 | 1249.9 | 1248.8 |
| 90 | 29.914 | 29.856 | 784.7 | 591.1 | 564.8 | 589.4 | 544.8 | 45.5 | 43.96 | 4.41 | 52.14 | 64.28 | 920.4 | 1358.0 | 726.7 | 1223.5 | 1271.4 | 1269.0 |
| 95 | 30.382 | 30.293 | 786.6 | 587.4 | 561.1 | 585.7 | 551.3 | 44.0 | 44.50 | 4.30 | 52.83 | 64.78 | 928.7 | 1374.6 | 740.0 | 1243.5 | 1291.3 | 1287.5 |

Stator

| %SPAN | INCS DEGREE | INCM DEGREE | DEV DEGREE | TURN DEGREE | CAMBER DEGREE | OMEGA-B SHOCK | D-FAC SHOCK | OMEGA-B LOSS-P | OMEGA-B LOSS-P | OMEGA-B LOSS-P | OMEGA-B LOSS-P | OMEGA-B LOSS-P | OMEGA-B LOSS-P | OMEGA-B LOSS-P | OMEGA-B LOSS-P | OMEGA-B LOSS-P | OMEGA-B LOSS-P | OMEGA-B LOSS-P |
|-------|----------------|----------------|---------------|----------------|------------------|------------------|----------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| 5 | -5.80 | -2.87 | 13.71 | 39.03 | 55.88 | .0000 | .3616 | .1245 | .0310 | .0310 | .9537 | .0000 | .0000 | .7374 | .8352 | .6490 | .6769 | 1.0080 |
| 10 | -5.41 | -2.48 | 11.70 | 39.57 | 53.85 | .0000 | .3582 | .0893 | .0228 | .0228 | .9691 | .0000 | .0000 | .8151 | .7948 | .6284 | .6730 | 1.0185 |
| 15 | -5.33 | -2.39 | 10.67 | 39.43 | 52.45 | .0000 | .3526 | .0529 | .0138 | .0138 | .9830 | .0000 | .0000 | .8829 | .7831 | .6086 | .6781 | 1.0248 |
| 30 | -6.64 | -3.65 | 11.18 | 35.83 | 50.67 | .0000 | .3490 | .0915 | .0144 | .0144 | .9847 | .0000 | .0000 | .8729 | .7276 | .5817 | .7387 | 1.0212 |
| 50 | -4.98 | -1.86 | 11.49 | 36.44 | 49.61 | .0001 | .3667 | .0368 | .0113 | .0113 | .9900 | .0000 | .0000 | .9262 | .6912 | .5528 | .7781 | 1.0970 |
| 70 | -4.4 | 2.79 | 12.99 | 40.05 | 49.93 | .0040 | .4236 | .0424 | .0140 | .0127 | .9895 | .0000 | .0000 | .9570 | .6926 | .5079 | .7822 | 1.1273 |
| 85 | 3.47 | 6.78 | 18.54 | 40.41 | 52.03 | .0135 | .4690 | .1034 | .0361 | .0314 | .9738 | .0000 | .0000 | .8176 | .6592 | .4913 | .7770 | 1.1303 |
| 90 | 4.34 | 7.66 | 21.81 | 39.55 | 53.55 | .0152 | .4731 | .1136 | .0402 | .0349 | .9710 | .0000 | .0000 | .7956 | .6633 | .4908 | .7783 | 1.1275 |
| 95 | 4.83 | 8.19 | 23.98 | 40.20 | 56.01 | .0130 | .4863 | .1245 | .0448 | .0401 | .9682 | .0000 | .0000 | .7636 | .6633 | .4860 | .7814 | 1.1375 |

NCORR WCORR TO/TO PO/PO EFF-AD EFF-P WC1/A1
INLET INLET INLET INLET INLET LBM/SEC
9741. 155.87 1.1766 1.5953 80.77 82.65 34.99

STA-1 STA-2
---LOCAL---

10.0 11.0

TABLE 14.1

BLADE-ELEMENT AND OVERALL PERFORMANCE WITH RADIAL INLET DISTORTION
100 PERCENT OF DESIGN SPEED

Rotor

| % SPAN | DIA-1 IN | DIA-2 IN | V-1 FT/SEC | V-2 FT/SEC | VM-1 FT/SEC | VM-2 FT/SEC | V0-1 FT/SEC | V0-2 FT/SEC | B-1 DEGREE | B-2 DEGREE | B*-1 DEGREE | B*-2 DEGREE | V*-1 FT/SEC | V*-2 FT/SEC | V0*-1 FT/SEC | V0*-2 FT/SEC | U*-1 FT/SEC | U*-2 FT/SEC |
|--------|----------------|----------------|---------------|----------------|------------------|------------------|------------------|-----------------|-------------------|---------------|----------------|----------------|----------------|----------------|-----------------|-----------------|----------------|----------------|
| 5 | 17.467 | 19.769 | 653.9 | 1024.8 | 653.9 | 757.7 | 0 | 690.1 | .00 | 42.32 | 52.29 | 19.41 | 1069.0 | 803.4 | -845.6 | -267.0 | 845.6 | 957.1 |
| 10 | 18.467 | 20.408 | 675.0 | 979.1 | 675.0 | 733.5 | 0 | 648.5 | .00 | 41.47 | 52.94 | 20.84 | 1120.3 | 809.0 | -894.0 | -339.6 | 894.0 | 988.0 |
| 15 | 19.467 | 21.047 | 695.4 | 931.5 | 695.4 | 703.6 | 0 | 610.5 | .00 | 40.94 | 53.57 | 30.11 | 1171.3 | 814.6 | -942.5 | -408.4 | 942.5 | 1019.0 |
| 30 | 22.314 | 22.964 | 716.3 | 831.7 | 716.3 | 646.7 | 0 | 522.0 | .00 | 38.95 | 56.43 | 42.26 | 1296.4 | 875.3 | -1088.3 | -588.8 | 1088.3 | 1111.8 |
| 50 | 25.791 | 25.520 | 678.5 | 782.8 | 678.5 | 611.9 | 0 | 488.3 | .00 | 38.60 | 61.46 | 50.65 | 1421.4 | 966.2 | -1248.6 | -747.2 | 1248.6 | 1259.3 |
| 70 | 28.954 | 28.076 | 570.4 | 739.0 | 570.4 | 554.3 | 0 | 488.4 | .00 | 41.39 | 67.84 | 57.52 | 1513.8 | 1032.5 | -1401.8 | -870.9 | 1401.8 | 1354.3 |
| 85 | 31.295 | 29.993 | 521.8 | 728.0 | 521.8 | 495.4 | 0 | 535.4 | .00 | 47.12 | 70.99 | 61.66 | 1602.5 | 1043.7 | -1515.1 | -918.6 | 1515.1 | 1452.1 |
| 90 | 31.883 | 30.630 | 512.3 | 745.5 | 512.3 | 507.1 | 0 | 546.4 | .00 | 47.14 | 71.64 | 61.56 | 1626.4 | 1065.0 | -1543.6 | -936.5 | 1543.6 | 1482.9 |
| 95 | 32.499 | 31.271 | 500.9 | 745.9 | 500.9 | 479.8 | 0 | 571.0 | .00 | 49.96 | 72.34 | 63.03 | 1651.2 | 1058.0 | -1573.4 | -942.9 | 1573.4 | 1513.9 |
| % SPAN | INCS DEGREE | INCM DEGREE | DEV DEGREE | TURN DEGREE | CAMBER DEGREE | OMEGA-B SHOCK | D-FAC OMEGA-B | LOSS-P TOTAL | LOSS-P PROFILE | P01 TOTAL | B*-1 DEGREE | B*-2 DEGREE | V*-1 FT/SEC | V*-2 FT/SEC | V0*-1 FT/SEC | V0*-2 FT/SEC | M*-1 | M*-2 |
| 5 | -3.12 | 3.31 | 17.54 | 32.87 | 47.12 | .0072 | .3989 | .1304 | .0270 | .0255 | 1.8496 | .9136 | .9051 | .8553 | .6082 | .8986 | .9958 | .7045 |
| 10 | -3.13 | 3.29 | 15.15 | 28.10 | 39.94 | .0103 | .4175 | .1600 | .0334 | .0312 | 1.7815 | .8823 | .8725 | .8266 | .6314 | .8552 | 1.0498 | .7066 |
| 15 | -3.02 | 2.94 | 13.90 | 23.45 | 34.34 | .0153 | .4344 | .1924 | .0399 | .0368 | 1.7099 | .8423 | .8238 | .7941 | .6502 | .8104 | 1.0979 | .7086 |
| 30 | -1.66 | 2.45 | 12.63 | 14.17 | 24.30 | .0367 | .4348 | .1976 | .0393 | .0317 | 1.6092 | .7948 | .7803 | .7789 | .6696 | .7184 | 1.2073 | .7560 |
| 50 | 1.43 | 4.30 | 8.42 | 10.80 | 14.64 | .0725 | .4244 | .1663 | .0322 | .0184 | 1.6491 | .8075 | .7932 | .7971 | .6392 | .6701 | 1.3107 | .8270 |
| 70 | 5.74 | 7.71 | 6.86 | 10.32 | 8.91 | .1157 | .4258 | .1457 | .0266 | .0059 | 1.7541 | .8307 | .8169 | .8102 | .5430 | .6241 | 1.3928 | .8719 |
| 85 | 7.59 | 8.93 | 7.29 | 9.33 | 7.72 | .1426 | .4673 | .2180 | .0376 | .0130 | 1.8000 | .7562 | .7354 | .7239 | .4847 | .6047 | 1.4307 | .8670 |
| 90 | 7.73 | 8.89 | 6.22 | 10.07 | 7.38 | .1499 | .4671 | .2284 | .0403 | .0144 | 1.8361 | .7508 | .7289 | .7131 | .4736 | .6174 | 1.4772 | .8819 |
| 95 | 8.07 | 9.01 | 7.04 | 9.31 | 7.31 | .1610 | .4870 | .2664 | .0455 | .0183 | 1.8503 | .7179 | .6926 | .6765 | .4805 | .6132 | 1.5028 | .8698 |

To/To PO/PO EFF-AD EFF-P

INLET INLET INLET INLET

1.2115 1.7033 77.64 79.86

Stator

| % SPAN | DIA-1 IN | DIA-2 IN | V-1 FT/SEC | V-2 FT/SEC | VM-1 FT/SEC | VM-2 FT/SEC | V0-1 FT/SEC | V0-2 FT/SEC | B-1 DEGREE | B-2 DEGREE | B*-1 DEGREE | B*-2 DEGREE | V*-1 FT/SEC | V*-2 FT/SEC | V0*-1 FT/SEC | V0*-2 FT/SEC | U*-1 FT/SEC | U*-2 FT/SEC |
|--------|----------------|----------------|---------------|----------------|------------------|------------------|------------------|-----------------|-------------------|---------------|----------------|----------------|----------------|----------------|-----------------|-----------------|----------------|----------------|
| 5 | 20.409 | 21.489 | 1094.3 | 956.0 | 866.2 | 954.1 | 668.8 | -31.9 | 37.67 | -3.69 | 20.23 | 49.11 | 923.2 | 1457.5 | -319.3 | -1101.9 | 988.1 | 1040.4 |
| 10 | 21.008 | 21.961 | 1050.7 | 939.6 | 840.1 | 939.0 | 631.1 | -32.8 | 36.91 | -2.00 | 24.68 | 49.41 | 925.0 | 1443.3 | -386.0 | -1096.0 | 1017.1 | 1053.2 |
| 15 | 21.589 | 22.432 | 1005.9 | 918.0 | 810.1 | 917.8 | 596.2 | -20.3 | 36.34 | -1.27 | 28.99 | 50.32 | 927.0 | 1437.6 | -449.0 | -1106.3 | 1045.2 | 1085.0 |
| 30 | 23.314 | 23.902 | 914.0 | 841.7 | 755.1 | 841.2 | 515.0 | -27.1 | 34.29 | -1.84 | 35.07 | 54.61 | 973.5 | 1452.8 | -613.7 | -1184.3 | 1128.7 | 1157.2 |
| 50 | 25.601 | 25.893 | 878.4 | 800.1 | 731.8 | 799.5 | 485.8 | -30.9 | 33.58 | -2.22 | 45.83 | 58.10 | 1050.8 | 1513.1 | -753.7 | -1284.5 | 1239.4 | 1259.6 |
| 70 | 27.818 | 27.902 | 861.7 | 759.4 | 708.3 | 758.1 | 490.5 | -44.8 | 34.70 | -3.38 | 50.40 | 61.49 | 1111.3 | 1588.2 | -856.2 | -1395.6 | 1346.8 | 1350.8 |
| 85 | 29.408 | 29.382 | 881.8 | 751.7 | 693.6 | 751.5 | 544.5 | -15.4 | 38.13 | -1.17 | 51.73 | 62.41 | 1119.9 | 1622.4 | -879.2 | -1437.8 | 1423.7 | 1422.9 |
| 90 | 29.914 | 29.856 | 907.5 | 777.2 | 711.8 | 777.0 | 562.9 | 12.0 | 38.34 | .88 | 51.20 | 61.54 | 1136.0 | 1630.5 | -885.4 | -1433.5 | 1448.2 | 1445.4 |
| 95 | 30.382 | 30.293 | 919.5 | 790.2 | 706.5 | 789.9 | 588.4 | 21.4 | 39.79 | 1.55 | 51.32 | 61.34 | 1130.4 | 1647.0 | -882.4 | -1445.2 | 1470.9 | 1466.6 |
| % SPAN | INCS DEGREE | INCM DEGREE | DEV DEGREE | TURN DEGREE | CAMBER DEGREE | OMEGA-B SHOCK | D-FAC OMEGA-B | LOSS-P TOTAL | LOSS-P PROFILE | P01 TOTAL | B*-1 DEGREE | B*-2 DEGREE | V*-1 FT/SEC | V*-2 FT/SEC | V0*-1 FT/SEC | V0*-2 FT/SEC | M*-1 | M*-2 |
| 5 | -8.60 | -5.68 | 8.72 | 41.36 | 55.87 | .0000 | .2887 | .2554 | .0633 | .6842 | .0000 | .0000 | .0000 | .0000 | .1943 | .9655 | .8297 | .8180 |
| 10 | -8.40 | -5.47 | 9.44 | 38.91 | 53.83 | .0000 | .2636 | .2077 | .0529 | .9113 | .0000 | .0000 | .0000 | .0000 | .2206 | .9264 | .8159 | .8167 |
| 15 | -8.06 | -5.14 | 9.64 | 37.61 | 52.38 | .0000 | .2446 | .1593 | .0416 | .9364 | .0000 | .0000 | .0000 | .0000 | .2739 | .8859 | .7969 | .8150 |
| 30 | -8.15 | -5.15 | 9.37 | 36.14 | 50.66 | .0000 | .2437 | .1178 | .0331 | .9596 | .0000 | .0000 | .0000 | .0000 | .3848 | .7990 | .7279 | .8487 |
| 50 | -7.20 | -4.08 | 9.81 | 35.79 | 49.60 | .0000 | .2684 | .1260 | .0386 | .9599 | .0000 | .0000 | .0000 | .0000 | .4089 | .7620 | .6865 | .9082 |
| 70 | -5.31 | -2.08 | 10.08 | 38.08 | 49.90 | .0007 | .3244 | .1656 | .0548 | .9497 | .0000 | .0000 | .0000 | .0000 | .4321 | .7381 | .6438 | .9533 |
| 85 | -1.35 | 1.96 | 14.72 | 39.30 | 52.00 | .0047 | .3697 | .2056 | .0719 | .9366 | .0000 | .0000 | .0000 | .0000 | .3953 | .7422 | .6265 | .9443 |
| 90 | -1.36 | 1.97 | 18.35 | 37.46 | 53.62 | .0049 | .3596 | .1968 | .0699 | .9368 | .0000 | .0000 | .0000 | .0000 | .4236 | .7624 | .6462 | .9589 |
| 95 | .14 | 3.50 | 21.24 | 38.24 | 56.00 | .0061 | .3633 | .1881 | .0678 | .9389 | .0000 | .0000 | .0000 | .0000 | .4192 | .7702 | .6529 | .9458 |

NCORR WCORR To/To PO/PO EFF-AD EFF-P WCI/A1

INLET INLET INLET INLET INLET INLET LBM/SEC

RPM LBM/SEC % % SGFT

11095. 175.87 1.2115 1.6071 68.57 71.21 39.48

STA-1 STA-2

---LOCAL---

10.0 11.0

TABLE 14.2

BLADE-ELEMENT AND OVERALL PERFORMANCE WITH RADIAL INLET DISTORTION
100 PERCENT OF DESIGN SPEED

Rotor

| %SPAN | DIA-1 IN | DIA-2 IN | V-1 FT/SEC | V-2 FT/SEC | VM-1 FT/SEC | VM-2 FT/SEC | V0-1 FT/SEC | V0-2 FT/SEC | B-1 DEGREE | B-2 DEGREE | B*-1 DEGREE | B*-2 DEGREE | V*-1 FT/SEC | V*-2 FT/SEC | V0*-1 FT/SEC | V0*-2 FT/SEC | U-1 FT/SEC | U-2 FT/SEC |
|-------|-------------|-------------|---------------|---------------|----------------|----------------|----------------|----------------|---------------|---------------|----------------|----------------|----------------|----------------|-----------------|-----------------|---------------|---------------|
| 5 | 17.467 | 19.769 | 645.8 | 987.9 | 645.8 | 689.3 | 0 | 707.7 | 0.0 | 45.75 | 52.60 | 19.80 | 1063.2 | 732.7 | 844.6 | 248.2 | 844.6 | 955.9 |
| 10 | 18.467 | 20.408 | 666.8 | 947.7 | 666.8 | 670.0 | 0 | 670.3 | 0.0 | 45.01 | 53.25 | 25.27 | 1114.5 | 741.6 | 892.9 | 318.5 | 892.9 | 986.8 |
| 15 | 19.467 | 21.047 | 687.3 | 906.1 | 687.3 | 648.0 | 0 | 633.3 | 0.0 | 44.34 | 53.85 | 38.63 | 1165.6 | 754.3 | 841.3 | 384.3 | 941.3 | 1017.7 |
| 30 | 22.314 | 22.964 | 708.8 | 828.2 | 708.8 | 609.3 | 0 | 560.9 | 0.0 | 42.63 | 56.68 | 42.00 | 1291.1 | 821.0 | 1078.9 | 549.4 | 1078.9 | 1110.4 |
| 50 | 25.791 | 25.520 | 718.8 | 781.8 | 718.8 | 568.5 | 0 | 536.7 | 0.0 | 43.36 | 61.66 | 50.79 | 1416.9 | 900.1 | 1247.1 | 697.3 | 1247.1 | 1234.8 |
| 70 | 28.954 | 28.076 | 568.1 | 746.7 | 568.1 | 512.6 | 0 | 543.0 | 0.0 | 46.65 | 67.90 | 57.82 | 1511.3 | 962.4 | 1400.0 | 814.6 | 1400.0 | 1351.6 |
| 85 | 31.295 | 29.993 | 522.6 | 783.5 | 522.6 | 513.6 | 0 | 591.7 | 0.0 | 49.04 | 70.94 | 59.11 | 1601.0 | 1000.5 | 1513.2 | 858.6 | 1513.2 | 1450.3 |
| 90 | 31.883 | 30.630 | 513.2 | 788.5 | 513.2 | 494.6 | 0 | 613.8 | 0.0 | 51.15 | 71.59 | 60.31 | 1624.8 | 998.5 | 1541.6 | 867.2 | 1541.6 | 1481.1 |
| 95 | 32.499 | 31.271 | 501.5 | 763.9 | 501.5 | 422.1 | 0 | 636.6 | 0.0 | 56.45 | 72.29 | 64.26 | 1649.6 | 971.9 | 1571.4 | 875.4 | 1571.4 | 1512.8 |

| %SPAN | INCS DEGREE | INCM DEGREE | DEV DEGREE | TURN DEGREE | CAMBER DEGREE | OMEGA-B SHOCK | D-FAC OMEGA-B | LOSS-P TOTAL | LOSS-P PROFILE | P02/ P01 | EFF-P TOTAL | EFF-AD TOTAL | EFF-P STATIC | M-1 | M-2 | M*-1 | M*-2 |
|-------|----------------|----------------|---------------|----------------|------------------|------------------|------------------|-----------------|-------------------|-------------|----------------|-----------------|-----------------|-------|-------|-------|--------|
| 5 | -2.82 | 3.61 | 17.93 | 32.80 | 47.12 | .0077 | .4660 | .1355 | .0280 | .0264 | 1.8739 | .9129 | .8675 | .5993 | .8593 | .9875 | .6375 |
| 10 | -2.82 | 3.60 | 15.59 | 27.97 | 39.95 | .0105 | .4796 | .1350 | .0322 | .0300 | 1.8217 | .8900 | .8806 | .8494 | .6213 | .8215 | 1.0392 |
| 15 | -2.78 | 3.29 | 14.26 | 23.22 | 34.18 | .0154 | .4883 | .1729 | .0357 | .0325 | 1.7657 | .8640 | .8528 | .8313 | .6405 | .7829 | 1.0867 |
| 30 | -1.49 | 2.66 | 12.38 | 14.68 | 24.31 | .0385 | .4826 | .1644 | .0320 | .0252 | 1.7105 | .8417 | .8291 | .8304 | .6620 | .7107 | 1.1970 |
| 50 | 1.54 | 4.46 | 8.55 | 10.88 | 14.61 | .0724 | .4796 | .1446 | .0279 | .0143 | 1.7714 | .8473 | .8347 | .8399 | .6344 | .6635 | 1.3024 |
| 70 | 5.68 | 7.70 | 7.10 | 10.08 | 8.84 | .1154 | .4832 | .1250 | .0226 | .0019 | 1.9068 | .8681 | .8556 | .8532 | .5448 | .6247 | 1.3763 |
| 85 | 7.54 | 8.89 | 4.71 | 11.83 | 7.70 | .1415 | .5067 | .1646 | .0307 | .0048 | 2.0349 | .8344 | .8169 | .8059 | .4856 | .6473 | 1.4483 |
| 90 | 7.68 | 8.83 | 4.98 | 11.28 | 7.40 | .1489 | .5225 | .1391 | .0365 | .0105 | 2.0583 | .8057 | .7848 | .7726 | .4740 | .6473 | 1.4772 |
| 95 | 8.04 | 8.97 | 8.28 | 8.03 | 7.34 | .1600 | .5532 | .2345 | .0416 | .0158 | 2.0386 | .7558 | .7303 | .7217 | .4605 | .6211 | 1.5027 |

| TO/TO INLET | PO/PO INLET | EFF-AD INLET | EFF-P INLET | STA-1 LOCAL | STA-2 |
|----------------|----------------|-----------------|----------------|----------------|-------|
|----------------|----------------|-----------------|----------------|----------------|-------|

TO/TO PO/PO EFF-AD EFF-P
INLET INLET INLET INLET
1.2304 1.8265 81.45 83.57

STA-1 STA-2
---LOCAL---
8.0 9.0

Stator

| %SPAN | DIA-1 IN | DIA-2 IN | V-1 FT/SEC | V-2 FT/SEC | VM-1 FT/SEC | VM-2 FT/SEC | V0-1 FT/SEC | V0-2 FT/SEC | B-1 DEGREE | B-2 DEGREE | B*-1 DEGREE | B*-2 DEGREE | V*-1 FT/SEC | V*-2 FT/SEC | V0*-1 FT/SEC | V0*-2 FT/SEC | U-1 FT/SEC | U-2 FT/SEC |
|-------|-------------|-------------|---------------|---------------|----------------|----------------|----------------|----------------|---------------|---------------|----------------|----------------|----------------|----------------|-----------------|-----------------|---------------|---------------|
| 5 | 20.409 | 21.489 | 1041.9 | 796.2 | 784.7 | 795.7 | 685.5 | 27.8 | 41.14 | 2.00 | 21.01 | 51.80 | 840.6 | 1286.7 | 301.3 | 1011.2 | 966.8 | 1039.1 |
| 10 | 21.008 | 21.961 | 1003.8 | 776.4 | 763.3 | 776.2 | 651.9 | 13.3 | 40.49 | .97 | 25.49 | 53.48 | 846.1 | 1304.8 | 363.9 | 1048.6 | 1015.8 | 1061.9 |
| 15 | 21.589 | 22.432 | 964.2 | 750.1 | 740.2 | 750.1 | 617.8 | -4 | 39.84 | -.04 | 29.90 | 55.34 | 854.7 | 1319.4 | 426.0 | 1085.0 | 1043.9 | 1084.7 |
| 30 | 23.314 | 23.902 | 892.6 | 684.8 | 701.3 | 684.8 | 552.2 | -5.7 | 38.21 | -4.8 | 39.33 | 59.47 | 907.4 | 1348.4 | 575.1 | 1161.4 | 1127.3 | 1155.7 |
| 50 | 25.601 | 25.893 | 859.0 | 667.1 | 672.8 | 667.0 | 534.1 | -11.8 | 38.45 | -1.01 | 46.28 | 62.17 | 973.9 | 1429.0 | 703.8 | 1263.8 | 1237.9 | 1252.0 |
| 70 | 27.818 | 27.902 | 847.5 | 654.1 | 647.3 | 654.0 | 547.0 | -11.7 | 40.20 | -1.02 | 50.96 | 64.33 | 1027.6 | 1509.8 | 798.1 | 1360.8 | 1345.1 | 1349.1 |
| 85 | 29.408 | 29.382 | 907.7 | 676.5 | 677.7 | 674.6 | 603.8 | 50.5 | 41.70 | 4.28 | 50.36 | 63.79 | 1062.4 | 1527.3 | 818.1 | 1370.2 | 1422.0 | 1420.7 |
| 90 | 29.914 | 29.856 | 923.4 | 694.9 | 675.2 | 689.9 | 629.8 | 82.7 | 43.01 | 6.83 | 50.42 | 63.12 | 1059.6 | 1525.8 | 816.6 | 1360.9 | 1446.4 | 1443.6 |
| 95 | 30.382 | 30.293 | 914.5 | 683.2 | 637.7 | 680.5 | 655.5 | 59.3 | 45.79 | 4.97 | 51.91 | 64.16 | 1033.7 | 1561.6 | 813.6 | 1405.5 | 1469.1 | 1464.8 |

| %SPAN | INCS DEGREE | INCM DEGREE | DEV DEGREE | TURN DEGREE | CAMBER DEGREE | OMEGA-B SHOCK | D-FAC OMEGA-B | LOSS-P TOTAL | LOSS-P PROFILE | B-2 DEGREE | B*-1 DEGREE | B*-2 DEGREE | EFF-P TOTAL | EFF-P STATIC | M-1 | M-2 | M*-1 | M*-2 |
|-------|----------------|----------------|---------------|----------------|------------------|------------------|------------------|-----------------|-------------------|---------------|----------------|----------------|----------------|-----------------|-------|-------|--------|------|
| 5 | -5.02 | -2.09 | 14.41 | 39.14 | 55.88 | .0000 | .3884 | .1210 | .0301 | .0301 | .9495 | .0000 | .7778 | .9066 | .6754 | .7359 | 1.0715 | |
| 10 | -4.78 | -1.84 | 12.42 | 39.52 | 53.86 | .0000 | .3851 | .0897 | .0229 | .0229 | .9647 | .0000 | .0000 | .8695 | .6588 | .7396 | 1.1072 | |
| 15 | -4.57 | -1.63 | 10.92 | 39.89 | 52.44 | .0003 | .3865 | .0630 | .0165 | .0164 | .9767 | .0000 | .0000 | .8312 | .6361 | .7459 | 1.1188 | |
| 30 | -4.22 | -1.22 | 10.74 | 38.69 | 50.67 | .0005 | .4061 | .0604 | .0170 | .0168 | .9803 | .0000 | .0000 | .8786 | .5785 | .7856 | 1.1391 | |
| 50 | -2.36 | .76 | 11.02 | 39.46 | 49.60 | .0029 | .4171 | .0488 | .0150 | .0141 | .9852 | .0000 | .0000 | .9118 | .5598 | .8329 | 1.1991 | |
| 70 | .43 | 3.66 | 12.42 | 41.22 | 49.86 | .0096 | .4464 | .0096 | .0215 | .0183 | .9812 | .0000 | .0000 | .9030 | .8684 | .8684 | 1.2333 | |
| 85 | 2.18 | 5.50 | 20.17 | 37.42 | 51.99 | .0171 | .4679 | .1653 | .0576 | .0517 | .9474 | .0000 | .0000 | .7135 | .7587 | .8899 | 1.2490 | |
| 90 | 3.13 | 6.45 | 24.29 | 36.48 | 53.62 | .0211 | .4583 | .1588 | .0560 | .0486 | .9485 | .0000 | .0000 | .7332 | .7592 | .8877 | 1.2425 | |
| 95 | 5.93 | 9.30 | 24.66 | 40.61 | 56.02 | .0289 | .4885 | .1551 | .0557 | .0453 | .9511 | .0000 | .0000 | .7209 | .7515 | .8554 | 1.2509 | |

NCORR WCORR TO/TO PO/PO EFF-AD EFF-P WCI/AI
INLET INLET INLET INLET
11002. 174.90 1.2304 1.7750 77.25 79.63 39.26

---LOCAL---
10.0 11.0

BLADE-ELEMENT AND OVERALL PERFORMANCE WITH RADIAL INLET DISTORTION
100 PERCENT OF DESIGN SPEED

Rotor

| %SPAN | DIA-1 IN | DIA-2 IN | V-1 FT/SEC | V-2 FT/SEC | VM-1 FT/SEC | VM-2 FT/SEC | V0-1 FT/SEC | V0-2 FT/SEC | B-1 DEGREE | B-2 DEGREE | B1-1 DEGREE | B1-2 DEGREE | V1-1 FT/SEC | V1-2 FT/SEC | V0-1-1 FT/SEC | V0-1-2 FT/SEC | U-1 FT/SEC | U-2 FT/SEC | |
|-------|-------------|-------------|---------------|---------------|----------------|----------------|----------------|----------------|---------------|---------------|----------------|----------------|----------------|----------------|------------------|------------------|---------------|---------------|-------|
| 5 | 17.467 | 19.769 | 642.4 | 980.6 | 642.4 | 668.1 | .0 | 717.7 | .00 | 47.05 | 52.75 | 19.65 | 1061.4 | 709.5 | -844.9 | -238.5 | 844.9 | 950.3 | |
| 10 | 18.467 | 20.408 | 663.1 | 943.6 | 663.1 | 654.2 | .0 | 680.0 | .00 | 46.10 | 53.41 | 25.14 | 1112.5 | 723.3 | -893.3 | -307.2 | 893.3 | 987.2 | |
| 15 | 19.467 | 21.047 | 683.6 | 905.2 | 683.6 | 636.5 | .0 | 643.6 | .00 | 45.31 | 54.01 | 30.83 | 1163.7 | 739.3 | -941.7 | -374.5 | 941.7 | 1018.1 | |
| 30 | 22.314 | 22.964 | 705.2 | 830.9 | 705.2 | 600.6 | .0 | 574.2 | .00 | 43.71 | 56.82 | 41.74 | 1289.5 | 805.9 | -1079.4 | -536.7 | 1079.4 | 1110.8 | |
| 50 | 25.791 | 25.520 | 667.8 | 793.8 | 667.8 | 563.9 | .0 | 558.5 | .00 | 44.74 | 61.82 | 50.14 | 1415.4 | 880.7 | -1247.6 | -676.0 | 1247.6 | 1234.9 | |
| 70 | 28.954 | 28.076 | 563.1 | 764.1 | 563.1 | 501.6 | .0 | 576.4 | .00 | 48.97 | 68.08 | 57.31 | 1510.0 | 928.8 | -1400.5 | -781.7 | 1400.6 | 1358.1 | |
| 85 | 31.295 | 29.993 | 516.1 | 806.7 | 516.1 | 503.7 | .0 | 630.0 | .00 | 51.35 | 71.17 | 58.47 | 1599.4 | 963.1 | -1513.8 | -820.9 | 1513.8 | 1450.9 | |
| 90 | 31.883 | 30.630 | 506.5 | 808.1 | 506.5 | 471.8 | .0 | 655.7 | .00 | 54.28 | 71.82 | 60.28 | 1623.3 | 951.4 | -1542.3 | -825.9 | 1542.3 | 1481.7 | |
| 95 | 32.499 | 31.271 | 495.8 | 776.9 | 495.8 | 396.8 | .0 | 667.8 | .00 | 59.28 | 72.49 | 64.84 | 1643.4 | 933.4 | -1572.1 | -844.8 | 1572.1 | 1512.7 | |
| %SPAN | INCS | INCM | DEV | TURN | CAMBER | OMEGA-B | D-FAC | OMEGA-B | LOSS-P | LOSS-P | PO1 | PO2 | EFF-P | EFF-AD | EFF-P | M-1 | M-2 | M1-1 | M1-2 |
| 5 | -2.67 | 3.76 | 17.78 | 33.11 | 47.12 | .0079 | .4892 | .1307 | .0270 | .0254 | 1.8954 | .9174 | .9098 | .8768 | .5958 | .8507 | .9849 | .6153 | .6153 |
| 10 | -2.65 | 3.77 | 15.46 | 28.27 | 39.95 | .0108 | .4973 | .1419 | .0295 | .0273 | 1.8505 | .9011 | .8924 | .8659 | .6171 | .8162 | 1.0360 | .6256 | .6256 |
| 15 | -2.62 | 3.45 | 14.02 | 23.58 | 34.14 | .0156 | .5024 | .1555 | .0322 | .0289 | 1.8002 | .8801 | .8700 | .8516 | .6365 | .7807 | 1.0837 | .6377 | .6377 |
| 30 | -1.35 | 2.81 | 12.12 | 15.08 | 24.31 | .0388 | .4964 | .1902 | .0301 | .0224 | 1.7505 | .8475 | .8475 | .8482 | .6583 | .7117 | 1.1449 | .6402 | .6402 |
| 50 | 1.71 | 4.62 | 7.91 | 11.67 | 14.62 | .0727 | .4975 | .1387 | .0271 | .0133 | 1.8246 | .8591 | .8469 | .8502 | .6300 | .6719 | 1.3013 | .7439 | .7439 |
| 70 | 5.90 | 7.90 | 6.61 | 10.77 | 8.87 | .1160 | .5125 | .1372 | .0251 | .0040 | 1.9682 | .8627 | .8489 | .8452 | .5387 | .6363 | 1.3755 | .7135 | .7135 |
| 85 | 7.76 | 9.10 | 4.09 | 12.70 | 7.73 | .1425 | .5380 | .1785 | .0339 | .0074 | 2.1106 | .8297 | .8108 | .7979 | .4790 | .6630 | 1.4479 | .7917 | .7917 |
| 90 | 7.93 | 9.06 | 4.97 | 11.54 | 7.43 | .1499 | .5604 | .2209 | .0405 | .0144 | 2.1288 | .7952 | .7725 | .7586 | .4669 | .6594 | 1.4763 | .7762 | .7762 |
| 95 | 8.26 | 9.19 | 8.88 | 7.66 | 7.35 | .1610 | .5832 | .2658 | .0425 | .0170 | 2.0997 | .7545 | .7280 | .7189 | .4543 | .6286 | 1.5016 | .7553 | .7553 |

To/To PO/PO EFF-AD EFF-P

INLET INLET INLET INLET

1.2398 1.8757 82.02 84.15

STA-1 STA-2

---LOCAL---

8.0 9.0

Stator

| %SPAN | DIA-1 IN | DIA-2 IN | V-1 FT/SEC | V-2 FT/SEC | VM-1 FT/SEC | VM-2 FT/SEC | V0-1 FT/SEC | V0-2 FT/SEC | B-1 DEGREE | B-2 DEGREE | B'-1 DEGREE | B'-2 DEGREE | V'-1 FT/SEC | V'-2 FT/SEC | V0'-1 FT/SEC | V0'-2 FT/SEC | U'-1 FT/SEC | U'-2 FT/SEC | |
|-------|-------------|-------------|---------------|---------------|----------------|----------------|----------------|----------------|-----------------|-------------------|----------------|----------------|----------------|-----------------|-----------------|-----------------|----------------|----------------|--------|
| 5 | 20.409 | 21.489 | 1029.1 | 756.4 | 758.7 | 755.8 | 695.3 | 29.9 | 42.50 | 2.27 | 21.05 | 53.18 | 812.9 | 1261.1 | -291.9 | -1009.6 | 987.2 | 1039.9 | |
| 10 | 21.008 | 21.961 | 993.8 | 736.8 | 741.9 | 736.7 | 661.2 | 10.4 | 41.70 | .80 | 25.57 | 54.99 | 822.9 | 1284.4 | -355.0 | -1051.9 | 1016.2 | 1062.3 | |
| 15 | 21.589 | 22.432 | 957.2 | 712.5 | 722.7 | 712.5 | 627.7 | -3.1 | 40.97 | -.26 | 29.94 | 56.78 | 834.7 | 1300.9 | -416.6 | -1088.2 | 1044.3 | 1085.1 | |
| 30 | 23.314 | 23.902 | 888.8 | 656.0 | 686.1 | 646.6 | 555.0 | -5.4 | 39.47 | -.47 | 39.34 | 60.54 | 887.7 | 1334.1 | -562.7 | -1161.6 | 1127.8 | 1159.2 | |
| 50 | 25.601 | 25.893 | 863.8 | 646.6 | 661.6 | 646.5 | 555.3 | -11.2 | 40.01 | -1.00 | 45.90 | 62.91 | 951.1 | 1419.5 | -683.1 | -1263.8 | 1238.4 | 1282.5 | |
| 70 | 27.818 | 27.902 | 856.0 | 637.6 | 629.7 | 637.5 | 579.9 | -8.3 | 42.64 | -.75 | 50.57 | 64.85 | 991.4 | 1500.2 | -769.8 | -1358.1 | 1345.6 | 1399.7 | |
| 85 | 29.408 | 29.382 | 921.0 | 662.5 | 660.6 | 660.5 | 641.7 | 50.0 | 44.17 | 4.33 | 49.77 | 64.28 | 1022.8 | 1522.1 | -780.9 | -1371.3 | 1422.6 | 1481.2 | |
| 90 | 29.914 | 29.856 | 934.0 | 678.6 | 649.3 | 675.1 | 671.3 | 69.3 | 45.96 | 5.86 | 50.08 | 63.85 | 1011.7 | 1531.7 | -775.8 | -1374.9 | 1447.0 | 1444.2 | |
| 95 | 30.382 | 30.293 | 917.7 | 667.7 | 608.1 | 665.9 | 687.4 | 48.8 | 48.50 | 4.19 | 52.14 | 64.82 | 990.9 | 1565.3 | -782.3 | -1416.6 | 1469.7 | 1465.4 | |
| %SPAN | INCS | INCM | DEV | TURN | CAMBER | OMEGA-B | D-FAC | OMEGA-B | LOSS-P TOTAL | LOSS-P PROFILE | PO1 | PO2 | EFF-P TOTAL | EFF-AD TOTAL | EFF-P STATIC | M-1 | M-2 | M'-1 | M'-2 |
| 5 | -3.68 | -1.76 | 14.68 | 40.24 | 55.88 | .0000 | .4213 | .1181 | .0294 | .0294 | .9518 | .0000 | .0000 | .8018 | .8925 | .6379 | .7098 | 1.0630 | 1.0630 |
| 10 | -3.60 | -1.66 | 12.24 | 40.91 | 53.86 | .0005 | .4218 | .0949 | .0242 | .0241 | .9633 | .0000 | .0000 | .8456 | .8593 | .6217 | .7179 | 1.0837 | 1.0837 |
| 15 | -3.43 | -1.49 | 10.69 | 41.23 | 52.43 | .0007 | .4247 | .0733 | .0192 | .0190 | .9733 | .0000 | .0000 | .8738 | .8284 | .6009 | .7264 | 1.0772 | 1.0772 |
| 30 | -2.98 | .02 | 10.75 | 39.94 | 50.67 | .0012 | .4399 | .0605 | .0170 | .0166 | .9805 | .0000 | .0000 | .8912 | .7671 | .5516 | .7656 | 1.1217 | 1.1217 |
| 50 | -.92 | 2.20 | 11.03 | 41.01 | 49.59 | .0050 | .4514 | .0521 | .0160 | .0141 | .9842 | .0000 | .0000 | .9266 | .7390 | .5397 | .8109 | 1.1850 | 1.1850 |
| 70 | 2.83 | 6.06 | 12.69 | 43.39 | 49.87 | .0197 | .4827 | .0858 | .0218 | .0153 | .9808 | .0000 | .0000 | .9272 | .7170 | .5255 | .8327 | 1.2366 | 1.2366 |
| 85 | 4.53 | 7.84 | 20.22 | 39.84 | 52.01 | .0304 | .5054 | .1740 | .0607 | .0501 | .9439 | .0000 | .0000 | .7537 | .7648 | .5378 | .8528 | 1.2350 | 1.2350 |
| 90 | 5.92 | 9.25 | 23.33 | 40.10 | 53.64 | .0387 | .5028 | .1681 | .0594 | .0457 | .9451 | .0000 | .0000 | .7438 | .7749 | .5476 | .8434 | 1.2361 | 1.2361 |
| 95 | 8.59 | 11.96 | 23.88 | 44.32 | 56.03 | .0474 | .5239 | .1492 | .0537 | .0366 | .9531 | .0000 | .0000 | .7457 | .7573 | .5351 | .8151 | 1.2349 | 1.2349 |

STA-1 STA-2

---LOCAL---

10.0 11.0

APPENDIX 5

CIRCUMFERENTIAL INLET DISTORTION, DISTRIBUTION,
AND OVERALL PERFORMANCE

ROTOR INLET CIRCUMFERENTIAL DISTRIBUTIONS
DISK PROBE STATION 7, 88% SPEED, $W\sqrt{\theta}/\delta = 161.54$

Inlet Plenum Conditions: $P_o = 1994$, $T_o = 519.6$

$\beta_{\gamma} = \tan^{-1} [\tan \beta_{\gamma} / \cos \epsilon]$

TABLE 15.2

ROTOR INLET CIRCUMFERENTIAL DISTRIBUTIONS
DISK PROBE STATION 7, 88% SPEED, $W\sqrt{\theta}/\delta = 140.53$

| Circumferential Position | % Span | 24° | | | | | 54° | | | | | 84° | | | | | 114° | | | | | | | | | |
|-----------------------------|--------|-----------|----------------------|-----------------|------|------|-------|-----------|----------------------|-----------------|------|------|-------|-----------|----------------------|-----------------|------|------|-------|-----------|----------------------|-----------------|------|------|-------|--|
| | | P_7/P_0 | $(90-\beta_7)^\circ$ | β_7° | M | V | V_m | P_7/P_0 | $(90-\beta_7)^\circ$ | β_7° | M | V | V_m | P_7/P_0 | $(90-\beta_7)^\circ$ | β_7° | M | V | V_m | P_7/P_0 | $(90-\beta_7)^\circ$ | β_7° | M | V | V_m | |
| 5 (hub) | | .931 | 32.74 | 56.3 | .384 | 422. | 351. | .890 | 28.03 | 64.5 | .345 | 381. | 344. | .826 | 16.91 | 83.2 | .207 | 230. | 229. | .861 | 19.94 | 108.0 | .305 | 338. | 321. | |
| 10 | | .921 | 29.70 | 60.3 | .372 | 410. | 356. | .879 | 26.29 | 66.0 | .332 | 367. | 335. | .827 | 17.57 | 83.6 | .230 | 255. | 253. | .841 | 17.43 | 104.1 | .262 | 291. | 282. | |
| 15 | | .919 | 28.22 | 64.6 | .376 | 414. | 374. | .867 | 23.09 | 65.8 | .311 | 343. | 313. | .828 | 17.72 | 84.4 | .245 | 272. | 271. | .833 | 15.77 | 104.1 | .247 | 274. | 266. | |
| 30 | | .958 | 29.76 | 73.5 | .476 | 519. | 498. | .838 | 15.91 | 67.9 | .253 | 280. | 260. | .831 | 17.33 | 87.8 | .283 | 314. | 314. | .827 | 14.10 | 104.2 | .253 | 281. | 273. | |
| 50 | | .931 | 23.10 | 75.0 | .436 | 478. | 462. | .836 | 13.60 | 78.1 | .256 | 284. | 278. | .831 | 14.52 | 93.2 | .287 | 318. | 317. | .818 | 9.50 | 118.2 | .227 | 252. | 222. | |
| 70 | | .918 | 18.47 | 77.2 | .405 | 445. | 434. | .823 | 9.85 | 78.1 | .215 | 239. | 234. | .817 | 10.03 | 102.4 | .237 | 263. | 257. | .808 | 4.69 | 122.1 | .128 | 143. | 121. | |
| 85 | | .933 | 17.18 | 75.2 | .415 | 455. | 440. | .811 | 4.15 | 85.5 | .100 | 111. | 111. | .819 | 8.72 | 102.1 | .225 | 249. | 244. | .817 | 5.12 | 115.1 | .143 | 159. | 144. | |
| 90 | | .934 | 16.37 | 74.0 | .407 | 447. | 430. | .812 | 3.66 | 85.5 | .071 | 101. | 101. | .820 | 8.54 | 102.1 | .226 | 251. | 246. | .814 | 3.61 | 115.0 | .102 | 114. | 103. | |
| 95 (tip) | | .926 | 13.91 | 72.0 | .358 | 395. | 375. | .805 | 0. | 91.1 | .000 | 0. | 0. | .818 | 7.48 | 104.0 | .206 | 229. | 222. | .816 | 3.34 | 115.0 | .097 | 108. | 98. | |
| MR | | .932 | 72.9 | | .421 | 462. | 441. | .842 | 73.4 | | .260 | 288. | 276. | .825 | | 94.3 | .256 | 283. | 283. | .825 | | 111.7 | .225 | 250. | 232. | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 144° | | | | | 174° | | | | | 204° | | | | | 234° | | | | | | | | | |
| 5 (hub) | | .954 | 22.59 | 119.4 | .445 | 487. | 424. | .944 | 104.2 | .000 | 0. | 0. | 0. | .964 | 26.73 | 94.5 | .372 | 410. | 409. | .963 | 26.30 | 89.8 | 349 | 385. | 385. | |
| 10 | | .941 | 22.30 | 116.7 | .436 | 477. | 427. | .965 | 26.27 | 102.1 | .425 | 466. | 456. | .966 | 26.49 | 94.6 | .391 | 431. | 429. | .966 | 26.29 | 90.7 | .373 | 411. | 411. | |
| 15 | | .936 | 22.77 | 112.4 | .438 | 480. | 444. | .964 | 25.05 | 102.8 | .429 | 470. | 458. | .965 | 25.65 | 94.5 | .399 | 439. | 437. | .967 | 25.65 | 91.6 | .388 | 427. | 426. | |
| 30 | | .940 | | 106.3 | .000 | 0. | 0. | .962 | 22.65 | 101.9 | .435 | 476. | 466. | .967 | 23.05 | 94.4 | .409 | 449. | 448. | .970 | 23.62 | 91.4 | .410 | 450. | 450. | |
| 50 | | .906 | 15.66 | 113.3 | .381 | 419. | 385. | .944 | 17.19 | 105.0 | .383 | 422. | 407. | .954 | 17.58 | 98.7 | .369 | 406. | 402. | .968 | 19.47 | 93.5 | .397 | 437. | 436. | |
| 70 | | .925 | 12.85 | 119.1 | .380 | 418. | 365. | .953 | 14.12 | 102.4 | .345 | 381. | 372. | .951 | 13.38 | 98.2 | .314 | 347. | 344. | .961 | 14.74 | 95.5 | .343 | 378. | 377. | |
| 85 | | .948 | 11.49 | 119.7 | .370 | 407. | 354. | .955 | 11.73 | 100.7 | .306 | 338. | 333. | .946 | 10.30 | 96.6 | .260 | 288. | 286. | .963 | 11.95 | 95.7 | .303 | 335. | 333. | |
| 90 | | .946 | 10.01 | 123.5 | .344 | 380. | 317. | .951 | 10.66 | 100.7 | .285 | 315. | 310. | .944 | 9.40 | 96.6 | .243 | 269. | 268. | .962 | 11.05 | 96.5 | .288 | 319. | 317. | |
| 95 (tip) | | .913 | .17 | 124.8 | .006 | 7. | 5. | .937 | 8.70 | 100.7 | .237 | 263. | 258. | .937 | 8.17 | 96.6 | .217 | 241. | 239. | .955 | 9.35 | 98.2 | .251 | 279. | 276. | |
| MR | | .930 | | 116.7 | .373 | 410. | 368. | .954 | 102.7 | | .375 | 413 | 403. | .956 | | 96.5 | .355 | 391. | 388. | .965 | | 93.6 | .366 | 403. | 402. | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 264° | | | | | 294° | | | | | 324° | | | | | 354° | | | | | | | | | |
| 5 (hub) | | .951 | 25.57 | 87.4 | .331 | 366. | 365. | .974 | 29.71 | 82.0 | .378 | 416. | 412. | .954 | 27.95 | 80.8 | .350 | 385. | 381. | .965 | 32.36 | 72.1 | .392 | 431. | 410. | |
| 10 | | .964 | 27.70 | 86.3 | .383 | 421. | 420. | .972 | 28.58 | 84.0 | .389 | 428. | 426. | .963 | 28.68 | 81.7 | .385 | 424. | 419. | .958 | 30.10 | 74.8 | .390 | 429. | 414. | |
| 15 | | .966 | 26.86 | 87.9 | .396 | 436. | 435. | .970 | 27.57 | 85.0 | .399 | 438. | 437. | .961 | 27.74 | 81.6 | .393 | 432. | 427. | .955 | 28.60 | 76.5 | .395 | 434. | 422. | |
| 30 | | .970 | 24.29 | 88.5 | .413 | 454. | 454. | .972 | 25.01 | 85.8 | .420 | 461. | 459. | .966 | 24.78 | 84.1 | .412 | 453. | 451. | .971 | 27.18 | 79.9 | .445 | 487. | 479. | |
| 50 | | .965 | 19.74 | 90.7 | .395 | 435. | 435. | .970 | 20.86 | 87.4 | .412 | 452. | 452. | .967 | 21.05 | 86.1 | .413 | 454. | 453. | .966 | 22.70 | 82.3 | .440 | 482. | 478. | |
| 70 | | .953 | 15.21 | 91.3 | .347 | 382. | 382. | .959 | 16.21 | 90.6 | .371 | 409. | 409. | .952 | 16.43 | 88.1 | .371 | 408. | 408. | .959 | 18.56 | 85.7 | .418 | 459. | 458. | |
| 85 | | .950 | 11.93 | 92.2 | .297 | 329. | 328. | .954 | 16.39 | 92.3 | .324 | 358. | 357. | .945 | 13.02 | 89.2 | .321 | 355. | 355. | .948 | 14.87 | 87.9 | .368 | 405. | 405. | |
| 90 | | .947 | 10.80 | 92.2 | .275 | 305. | 305. | .951 | 11.78 | 92.6 | .302 | 334. | 334. | .942 | 11.88 | 89.2 | .301 | 333. | 333. | .945 | 13.60 | 87.6 | .345 | 380. | 380. | |
| 95 (tip) | | .941 | 9.58 | 92.2 | .251 | 278. | 278. | .945 | 9.97 | 95.2 | .264 | 293. | 292. | .940 | .23 | 78.5 | .006 | 7. | 6. | .939 | 11.46 | 88.5 | .298 | 330. | 330. | |
| MR | | .960 | 90.1 | | .368 | 405. | 405. | .965 | 88.2 | | .382 | 421. | 421. | .958 | | 85.7 | .383 | 421. | 420. | .960 | | 82.5 | .410 | 450. | 447. | |

Inlet plenum conditions: $P_0 = 2022$ $T_0 = 512.0$

V_m calculation is based on standard-day inlet plenum conditions
Circumferential Reference position is TDC, looking forward
Relative position of circumferential distortion screen is $30^\circ - 150^\circ$
 $\beta_7^\circ = \tan^{-1} |\tan \beta_7 / \cos \epsilon|$

ROTOR INLET CIRCUMFERENTIAL DISTRIBUTIONS
DISK PROBE STATION 7, 100% OF DESIGN SPEED, $W\sqrt{\theta}/\delta = 177.2$

Inlet Plenum conditions: $P_0 = 1977 \text{ psfa}$ $T_0 = 519.4^\circ\text{R}$

V_m calculation is based on standard-day inlet plenum conditions
Circumferential reference position is TDC looking forward

$$\beta_7^0 = \tan^{-1} [\tan \beta_7 / \cos \epsilon]$$

$$\beta_7 = \tan^{-1} [\tan \beta_7 / \cos \epsilon]$$

TABLE 15.4

ROTOR INLET CIRCUMFERENTIAL DISTRIBUTIONS
DISK PROBE STATION 7, 100% OF DESIGN SPEED, $W\sqrt{\theta}/\delta = 165.68$

| Circumferential Position | 24° | | | | 54° | | | | 84° | | | | 114° | | | |
|-----------------------------|-------------|--------------|------------------------|------------------------|-------------|--------------|------------------------|------------------------|-------------|--------------|------------------------|------------------------|-------------|--------------|------------------------|------------------------|
| | P_T/P_0 | $90-\beta_T$ | $\frac{0}{90-\beta_T}$ | $\frac{0}{90-\beta_T}$ | P_T/P_0 | $90-\beta_T$ | $\frac{0}{90-\beta_T}$ | $\frac{0}{90-\beta_T}$ | P_T/P_0 | $90-\beta_T$ | $\frac{0}{90-\beta_T}$ | $\frac{0}{90-\beta_T}$ | P_T/P_0 | $90-\beta_T$ | $\frac{0}{90-\beta_T}$ | $\frac{0}{90-\beta_T}$ |
| ζ Span | M | V | V | V_m | M | V | V | V_m | M | V | V | V_m | M | V | V | V_m |
| 5 (hub) | .891 | 38.72 | 56.4 | .448 | 490. 408. | .833 | 34.74 | 62.6 | .408 | 448. 398. | .761 | 19.64 | 81.3 | .240 | 267. 264. | .804 |
| 10 | .879 | 35.34 | 60.6 | .439 | 481. 419. | .818 | 30.78 | 65.2 | .387 | 425. 386. | .762 | 20.09 | 81.2 | .272 | 302. 298. | .780 |
| 15 | .881 | 33.99 | 65.0 | .453 | 495. 449. | .807 | 28.14 | 65.0 | .374 | 412. 374. | .763 | 21.37 | 81.8 | .296 | 327. 324. | .768 |
| 30 | .940 | 35.29 | 73.8 | .576 | 623. 598. | .773 | 19.40 | 64.5 | .308 | 340. 307. | .768 | 21.40 | 85.1 | .352 | 388. 386. | .758 |
| 50 | .884 | 26.39 | 74.8 | .502 | 547. 528. | .764 | 15.42 | 77.3 | .299 | 331. 323. | .768 | 18.14 | 90.7 | .360 | 397. 397. | .751 |
| 70 | .875 | 21.67 | 76.0 | .476 | 520. 505. | .761 | 12.43 | 83.1 | .273 | 302. 300. | .757 | 13.47 | 94.5 | .309 | 342. 341. | .755 |
| 85 | .903 | 20.38 | 74.6 | .493 | 538. 519. | .767 | 10.98 | 83.2 | .264 | 294. 292. | .764 | 11.62 | 96.3 | .295 | 326. 324. | .763 |
| 90 | .908 | 19.33 | 73.4 | .482 | 526. 504. | .770 | 10.73 | 83.2 | .267 | 296. 294. | .769 | 11.36 | 96.3 | .296 | 328. 326. | .763 |
| 95 (tip) | .893 | 16.59 | 68.9 | .427 | 468. 437. | .773 | 10.23 | 83.2 | .263 | 291. 289. | .771 | 10.27 | 97.1 | .276 | 305. 303. | .762 |
| MR | .897 | | 72.4 | .498 | 543. 518. | .778 | | 74.6 | .311 | 344. 332. | .765 | | 90.2 | .322 | 356. 356. | .762 |
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| Circumferential Position | 144° | | | | 174° | | | | 204° | | | | 234° | | | |
| | P_T/P_0 | $90-\beta_T$ | $\frac{0}{90-\beta_T}$ | $\frac{0}{90-\beta_T}$ | P_T/P_0 | $90-\beta_T$ | $\frac{0}{90-\beta_T}$ | $\frac{0}{90-\beta_T}$ | P_T/P_0 | $90-\beta_T$ | $\frac{0}{90-\beta_T}$ | $\frac{0}{90-\beta_T}$ | P_T/P_0 | $90-\beta_T$ | $\frac{0}{90-\beta_T}$ | $\frac{0}{90-\beta_T}$ |
| 5 (hub) | .924 | 25.05 | 119.4 | .523 | 569. 495. | .939 | 29.66 | 103.1 | .481 | 525. 512. | .944 | 31.13 | 93.8 | .450 | 492. 491. | .936 |
| 10 | .912 | 25.19 | 116.2 | .519 | 564. 506. | .945 | 29.97 | 101.8 | .509 | 554. 542. | .947 | 30.64 | 93.8 | .468 | 511. 510. | .948 |
| 15 | .907 | 25.83 | 112.2 | .525 | 570. 528. | .944 | 29.10 | 101.8 | .518 | 563. 551. | .945 | 29.63 | 93.7 | .474 | 518. 517. | .955 |
| 30 | .898 | 24.98 | 106.8 | .531 | 577. 552. | .938 | 26.08 | 101.8 | .521 | 567. 555. | .943 | 26.78 | 93.7 | .488 | 532. 531. | .958 |
| 50 | .856 | 18.07 | 111.2 | .441 | 483. 451. | .929 | 21.59 | 101.7 | .486 | 531. 520. | .937 | 21.92 | 95.4 | .464 | 508. 505. | .954 |
| 70 | .890 | 15.73 | 115.4 | .460 | 503. 454. | .936 | 17.77 | 99.5 | .438 | 480. 473. | .934 | 17.23 | 95.3 | .408 | 448. 446. | .949 |
| 85 | .919 | 14.01 | 117.7 | .456 | 499. 442. | .938 | 14.97 | 99.4 | .398 | 437. 431. | .919 | 12.79 | 95.3 | .325 | 359. 357. | .948 |
| 90 | .919 | 12.96 | 119.6 | .441 | 483. 420. | .937 | 13.95 | 99.4 | .379 | 417. 411. | .915 | 11.57 | 95.2 | .300 | 332. 331. | .947 |
| 95 (tip) | .886 | 8.65 | 130.6 | .342 | 377. 286. | .926 | 12.08 | 99.4 | .333 | 368. 363. | .907 | 9.99 | 95.2 | .266 | 294. 293. | .939 |
| MR | .893 | | 114.0 | .477 | 521. 476. | .936 | | 100.9 | .468 | 511. 502. | .935 | | 94.7 | .435 | 476. 475. | .951 |
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| Circumferential Position | 264° | | | | 294° | | | | 324° | | | | 354° | | | |
| | P_T/P_0 | $90-\beta_T$ | $\frac{0}{90-\beta_T}$ | $\frac{0}{90-\beta_T}$ | P_T/P_0 | $90-\beta_T$ | $\frac{0}{90-\beta_T}$ | $\frac{0}{90-\beta_T}$ | P_T/P_0 | $90-\beta_T$ | $\frac{0}{90-\beta_T}$ | $\frac{0}{90-\beta_T}$ | P_T/P_0 | $90-\beta_T$ | $\frac{0}{90-\beta_T}$ | $\frac{0}{90-\beta_T}$ |
| 5 (hub) | .948 | 33.73 | 86.8 | .460 | 503. 502. | .956 | 31.09 | 82.8 | .470 | 513. 509. | .932 | 33.76 | 81.9 | .439 | 481. 476. | .931 |
| 10 | .949 | 33.31 | 86.7 | .480 | 524. 523. | .953 | 30.71 | 83.8 | .483 | 528. 525. | .949 | 34.43 | 83.1 | .482 | 526. 523. | .923 |
| 15 | .949 | 31.62 | 88.5 | .486 | 530. 530. | .952 | 30.25 | 85.1 | .494 | 539. 537. | .947 | 33.30 | 83.0 | .492 | 536. 532. | .934 |
| 30 | .955 | 29.46 | 88.4 | .521 | 567. 566. | .955 | 28.14 | 85.8 | .523 | 569. 567. | .946 | 29.67 | 85.5 | .512 | 557. 555. | .952 |
| 50 | .951 | 24.81 | 90.0 | .513 | 558. 558. | .954 | 24.71 | 87.5 | .522 | 567. 567. | .947 | 25.31 | 87.2 | .513 | 559. 558. | .943 |
| 70 | .943 | 20.26 | 90.7 | .474 | 518. 518. | .950 | 20.99 | 89.7 | .492 | 537. 537. | .941 | 19.83 | 88.1 | .482 | 526. 525. | .943 |
| 85 | .940 | 16.77 | 90.7 | .425 | 466. 466. | .946 | 17.54 | 90.5 | .446 | 488. 488. | .941 | 17.62 | 88.1 | .442 | 484. 484. | .937 |
| 90 | .935 | 15.48 | 90.7 | .402 | 441. 441. | .943 | 16.33 | 90.5 | .425 | 466. 466. | .941 | 16.49 | 88.1 | .425 | 466. 465. | .934 |
| 95 (tip) | .926 | 13.70 | 90.7 | .363 | 400. 400. | .934 | 14.28 | 91.3 | .381 | 419. 419. | .936 | 14.99 | 88.1 | .395 | 435. 434. | .920 |
| MR | .946 | | 89.6 | .480 | 524. 524. | .951 | | 87.7 | .490 | 534. 534. | .944 | | 86.5 | .482 | 526. 525. | .942 |

Inlet plenum conditions: $P_0 = 1987$, $T_0 = 524.5$

V_m calculation is based on standard-day inlet plenum conditions
Circumferential Reference position is TDC, looking forward
Relative position of circumferential distortion screen is $30^\circ - 150^\circ$
 $\beta_T = \tan^{-1} [\tan \beta_T / \cos \epsilon]$

ROTOR INLET CIRCUMFERENTIAL DISTRIBUTIONS
DISK PROBE STATION 7, 100% OF DESIGN SPEED, $w\sqrt{\theta}/\delta = 156.00$

Inlet plenum conditions: $P_0 = 2001$ $T_0 = 522.8$
 V_m calculation is based on standard-day inlet plenum conditions
 Circumferential Reference position is TDC, looking forward
 Relative position of circumferential distortion screen is $30^\circ - 150^\circ$
 $\beta_T = \tan^{-1} |\tan \beta_T' \cos \epsilon|$

TABLE 16.1
STATOR DISCHARGE CIRCUMFERENTIAL DISTRIBUTIONS
DISK PROBE STATION 12, 88% OF DESIGN SPEED, $W\sqrt{\theta}/\delta = 161.54$

| Circumferential Position | 12° | | | | 42° | | | | 72° | | | | 102° | | | |
|-----------------------------|--------|--------------|----------------------|------|-------|-------|--------------|----------------------|------|-------|-------|--------------|----------------------|------|-------|-------|
| | % Span | P_{12}/P_0 | $90^\circ\beta_{12}$ | M | V | V_m | P_{12}/P_0 | $90^\circ\beta_{12}$ | M | V | V_m | P_{12}/P_0 | $90^\circ\beta_{12}$ | M | V | V_m |
| 5 (hub) | | 1.337 | 87.8 | .931 | 1041. | 1040. | 1.349 | 89.4 | .829 | 921. | 921. | 1.070 | 88.4 | .646 | 751. | 750. |
| 10 | | 1.465 | 90.2 | .892 | 1016. | 1016. | 1.294 | 91.5 | .760 | 844. | 844. | 1.072 | 88.4 | .657 | 760. | 760. |
| 15 | | 1.446 | 89.6 | .876 | 1002. | 1002. | 1.284 | 91.4 | .743 | 826. | 825. | 1.108 | 88.8 | .656 | 757. | 757. |
| 30 | | 1.421 | 92.2 | .835 | 940. | 939. | 1.259 | 91.8 | .704 | 786. | 784. | 1.207 | 90.9 | .660 | 758. | 758. |
| 50 | | 1.373 | 91.9 | .791 | 898. | 898. | 1.206 | 93.6 | .645 | 721. | 720. | 1.237 | 91.8 | .646 | 743. | 742. |
| 70 | | 1.310 | 95.5 | .728 | 829. | 825. | 1.158 | 97.0 | .580 | 651. | 646. | 1.224 | 89.2 | .644 | 739. | 738. |
| 85 | | 1.313 | 92.3 | .689 | 791. | 790. | 1.167 | 91.1 | .550 | 624. | 624. | 1.220 | 85.5 | .641 | 742. | 739. |
| 90 | | 1.316 | 90.1 | .722 | 830. | 830. | 1.177 | 89.1 | .552 | 628. | 628. | 1.227 | 83.7 | .653 | 757. | 753. |
| 95 (tip) | | 1.325 | 89.6 | .719 | 831. | 831. | 1.137 | 93.1 | .496 | 567. | 566. | 1.207 | 84.8 | .645 | 751. | 748. |
| MR | | 1.380 | 91.6 | .795 | 905. | 904. | 1.223 | 92.6 | .660 | 740. | 739. | 1.206 | 88.9 | .649 | 748. | 748. |
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| 5 (hub) | | 1.330 | 92.8 | .866 | 982. | 980. | 1.606 | 87.0 | .965 | 1073. | 1072. | 1.528 | 89.8 | .977 | 1092. | 1092. |
| 10 | | 1.326 | 93.3 | .855 | 971. | 969. | 1.595 | 86.5 | .963 | 1066. | 1064. | 1.576 | 89.6 | .986 | 1094. | 1094. |
| 15 | | 1.392 | 92.5 | .862 | 978. | 977. | 1.604 | 86.9 | .959 | 1060. | 1058. | 1.559 | 89.4 | .962 | 1066. | 1066. |
| 30 | | 1.336 | 94.1 | .852 | 966. | 964. | 1.585 | 88.1 | .947 | 1046. | 1045. | 1.538 | 89.7 | .949 | 1047. | 1047. |
| 50 | | 1.390 | 93.2 | .844 | 968. | 967. | 1.526 | 89.4 | .927 | 1026. | 1026. | 1.543 | 90.3 | .930 | 1026. | 1026. |
| 70 | | 1.370 | 92.3 | .798 | 927. | 926. | 1.491 | 91.0 | .906 | 1004. | 1004. | 1.517 | 91.2 | .910 | 1006. | 1006. |
| 85 | | 1.350 | 76.2 | .756 | 890. | 864. | 1.464 | 89.0 | .877 | 984. | 983. | 1.448 | 91.2 | .872 | 977. | 977. |
| 90 | | 1.333 | 88.4 | .732 | 867. | 866. | 1.459 | 86.9 | .868 | 980. | 978. | 1.417 | 88.8 | .857 | 967. | 967. |
| 95 (tip) | | 1.271 | 88.9 | .673 | 802. | 801. | 1.452 | 88.3 | .843 | 958. | 958. | 1.338 | 89.4 | .823 | 935. | 935. |
| MR | | 1.340 | 90.9 | .813 | 938. | 938. | 1.530 | 88.8 | .920 | 1023. | 1022. | 1.512 | 90.2 | .922 | 1024. | 1024. |
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| 5 (hub) | | 1.615 | 89.1 | .978 | 1090. | 1090. | 1.481 | 99.6 | .987 | 1088. | 1073. | 1.594 | 98.6 | .969 | 1071. | 1059. |
| 10 | | 1.591 | 88.9 | .972 | 1080. | 1080. | 1.553 | 95.3 | .975 | 1074. | 1069. | 1.550 | 94.8 | .964 | 1061. | 1057. |
| 15 | | 1.567 | 89.3 | .964 | 1069. | 1069. | 1.548 | 94.0 | .955 | 1054. | 1052. | 1.529 | 93.8 | .942 | 1039. | 1036. |
| 30 | | 1.540 | 90.9 | .950 | 1052. | 1052. | 1.531 | 94.4 | .948 | 1047. | 1043. | 1.518 | 93.4 | .929 | 1024. | 1022. |
| 50 | | 1.499 | 88.8 | .937 | 1038. | 1038. | 1.498 | 93.7 | .936 | 1037. | 1035. | 1.477 | 94.3 | .907 | 1003. | 1001. |
| 70 | | 1.452 | 92.5 | .910 | 1011. | 1010. | 1.441 | 96.8 | .919 | 1018. | 1011. | 1.427 | 94.1 | .891 | 997. | 995. |
| 85 | | 1.416 | 90.0 | .887 | 996. | 996. | 1.430 | 93.8 | .911 | 1019. | 1017. | 1.395 | 93.5 | .886 | 980. | 972. |
| 90 | | 1.407 | 89.1 | .873 | 987. | 987. | 1.419 | 91.7 | .892 | 1005. | 1005. | 1.394 | 93.5 | .884 | 953. | 951. |
| 95 (tip) | | 1.390 | 91.0 | .840 | 957. | 957. | 1.318 | 93.0 | .817 | 930. | 929. | 1.402 | 91.4 | .826 | 935. | 934. |
| MR | | 1.494 | 90.3 | .927 | 1032. | 1032. | 1.478 | 94.8 | .932 | 1034. | 1030. | 1.413 | 92.4 | .900 | 999. | 996. |

Inlet Plenum Conditions: $P_o = 1994.0$ psia $T_o = 519.6^\circ\text{R}$
 V_m calculation is based on standard-day inlet plenum conditions
 Circumferential reference position is TDC looking forward
 Relative position of circumferential distortion screen is $30^\circ - 150^\circ$
 $\beta_{12}^\circ = \tan^{-1} \{ \tan \beta_{12} / \cos \epsilon \}$

STATOR DISCHARGE CIRCUMFERENTIAL DISTRIBUTIONS
DISK PROBE STATION 12, 88% OF DESIGN SPEED, $w\sqrt{\delta}/\delta = 140.53$

| Circumferential Position | 12° | | | | 42° | | | | 72° | | | | 102° | | | |
|-----------------------------|--------------|----------------|------|-------|--------------|----------------|------|-------|--------------|----------------|------|-------|--------------|----------------|------|-------|
| | P_{12}/P_0 | $90\beta_{12}$ | M | V_m | P_{12}/P_0 | $90\beta_{12}$ | M | V_m | P_{12}/P_0 | $90\beta_{12}$ | M | V_m | P_{12}/P_0 | $90\beta_{12}$ | M | V_m |
| 5 (hub) | 1.611 | 89.8 | 715 | 829. | 1.412 | 75.8 | .587 | 679. | 1.226 | 94.1 | .214 | 254. | 1.338 | 88.2 | .434 | 517. |
| 10 | 1.562 | 92.6 | .676 | 786. | 1.443 | 90.8 | .603 | 693. | 1.226 | 95.2 | .217 | 257. | 1.359 | 89.9 | .455 | 540. |
| 15 | 1.523 | 92.4 | .646 | 750. | 1.436 | 91.3 | .592 | 680. | 1.246 | 97.9 | .263 | 310. | 1.377 | 90.7 | .475 | 561. |
| 30 | 1.523 | 92.0 | .635 | 737. | 1.436 | 89.7 | .591 | 678. | 1.309 | 96.3 | .396 | 465. | 1.418 | 89.7 | .513 | 602. |
| 50 | 1.484 | 94.2 | .594 | 694. | 1.419 | 91.1 | .560 | 644. | 1.415 | 93.0 | .555 | 648. | 1.451 | 91.1 | .537 | 630. |
| 75 | 1.453 | 94.4 | .557 | 659. | 1.400 | 92.5 | .521 | 602. | 1.482 | 91.9 | .610 | 713. | 1.463 | 92.5 | .542 | 640. |
| 85 | 1.456 | 97.2 | .557 | 664. | 1.394 | 89.4 | .476 | 557. | 1.483 | 90.8 | .569 | 672. | 1.457 | 92.5 | .536 | 638. |
| 90 (tip) | 1.479 | 95.8 | .573 | 684. | 1.399 | 88.3 | .477 | 561. | 1.480 | 90.3 | .559 | 663. | 1.437 | 92.6 | .512 | 612. |
| 95 (tip) | 1.342 | 95.2 | .448 | 544. | 1.371 | 92.1 | .444 | 523. | 1.463 | 90.2 | .530 | 630. | 1.426 | 92.6 | .493 | 592. |
| MR | 1.489 | 92.3 | .601 | 705. | 1.415 | 89.8 | .548 | 633. | 1.416 | 92.9 | .530 | 623. | 1.432 | 91.3 | .519 | 613. |
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Inlet Plenum Conditions: $P_0 = 2022.0 \text{ psia}$, $T_0 = 512.0^\circ \text{R}$
 V_m calculation is based on standard-day inlet plenum conditions
 Circumferential reference position is TDC looking forward
 Relative position of circumferential distortion screen is $30^\circ - 150^\circ$
 $\beta_{1,2} = \tan^{-1} [\tan \beta_1 / \cos \epsilon]$

TABLE 16.3

STATOR DISCHARGE CIRCUMFERENTIAL DISTRIBUTIONS
DISK PROBE STATION 12, 100% OF DESIGN SPEED, $W\sqrt{\theta}/\delta = 177.2$

| Circumferential Position | 12° | | | | 42° | | | | 72° | | | | 102° | | | |
|-----------------------------|--------------|----------------------|-------------|-------|--------------|----------------------|-------------|-------|--------------|----------------------|-------|-------------|--------------|----------------------|-------------|-------|
| | P_{12}/P_o | $90^\circ\beta_{12}$ | M | V_m | P_{12}/P_o | $90^\circ\beta_{12}$ | M | V_m | P_{12}/P_o | $90^\circ\beta_{12}$ | M | V_m | P_{12}/P_o | $90^\circ\beta_{12}$ | M | V_m |
| % Span | | | | | | | | | | | | | | | | |
| 5 (hub) | 1.664 | 89.3 | .984 | 1114. | 1.453 | 93.1 | .949 | 1053. | 1.029 | 109.1 | .375 | 445. | 1.240 | 88.2 | .715 | 841. |
| 10 | 1.590 | 90.0 | .957 | 1086. | 1.412 | 93.3 | .911 | 1009. | 1.001 | 102.7 | .318 | 375. | 1.263 | 86.2 | .728 | 851. |
| 15 | 1.575 | 90.7 | .943 | 1069. | 1.404 | 92.5 | .898 | 995. | 1.019 | 98.3 | .370 | 433. | 1.276 | 87.4 | .734 | 856. |
| 30 | 1.572 | 91.3 | .936 | 1058. | 1.375 | 92.9 | .864 | 961. | 1.162 | 94.8 | .616 | 705. | 1.306 | 89.2 | .752 | 869. |
| 50 | 1.515 | 92.0 | .916 | 1040. | 1.333 | 94.8 | .805 | 899. | 1.267 | 92.5 | .709 | 808. | 1.316 | 89.5 | .748 | 863. |
| 70 | 1.428 | 91.6 | .858 | 982. | 1.268 | 95.9 | .720 | 813. | 1.256 | 94.4 | .678 | 780. | 1.311 | 88.4 | .734 | 848. |
| 85 | 1.376 | 88.8 | .803 | 933. | 1.252 | 91.2 | .674 | 772. | 1.260 | 91.8 | .646 | 751. | 1.301 | 85.1 | .718 | 840. |
| 90 | 1.396 | 87.3 | .807 | 941. | 1.269 | 89.2 | .679 | 782. | 1.277 | 89.3 | .647 | 756. | 1.327 | 83.6 | .731 | 858. |
| 95 (tip) | 1.409 | 87.9 | .795 | 931. | 1.213 | 92.2 | .619 | 717. | 1.260 | 89.0 | .625 | 731. | 1.328 | 86.7 | .714 | 842. |
| MR | 1.500 | 90.7 | .895 | 1022. | 1.331 | 93.5 | .801 | 899. | 1.218 | 94.0 | .641 | 739. | 1.303 | 87.9 | .735 | 854. |
| | | | 132° | | | | 162° | | | | | 192° | | | 222° | |
| 5 (hub) | 1.396 | 95.8 | .905 | 1042. | 1.727 | 86.3 | .975 | 1105. | 1.660 | 99.6 | 1.009 | 1147. | 1.820 | 89.5 | .990 | 1125. |
| 10 | 1.395 | 96.6 | .905 | 1041. | 1.707 | 86.2 | .970 | 1097. | 1.792 | 95.0 | 1.020 | 1157. | 1.793 | 88.5 | .990 | 1119. |
| 15 | 1.418 | 96.9 | .911 | 1048. | 1.710 | 86.7 | .967 | 1092. | 1.777 | 94.5 | 1.003 | 1142. | 1.750 | 89.5 | .989 | 1114. |
| 30 | 1.509 | 93.1 | .921 | 1063. | 1.744 | 87.5 | .962 | 1083. | 1.723 | 94.9 | .977 | 1120. | 1.687 | 89.1 | .959 | 1078. |
| 50 | 1.498 | 93.8 | .908 | 1061. | 1.714 | 88.9 | .947 | 1068. | 1.644 | 95.4 | .957 | 1096. | 1.635 | 90.4 | .945 | 1064. |
| 70 | 1.517 | 96.1 | .912 | 1067. | 1.599 | 91.1 | .923 | 1043. | 1.518 | 96.0 | .934 | 1068. | 1.508 | 92.3 | .914 | 1029. |
| 85 | 1.487 | 92.5 | .902 | 1069. | 1.481 | 91.4 | .865 | 994. | 1.475 | 93.7 | .903 | 1048. | 1.462 | 89.9 | .886 | 1008. |
| 90 | 1.463 | 90.5 | .872 | 1044. | 1.455 | 90.6 | .840 | 974. | 1.462 | 93.0 | .872 | 1021. | 1.434 | 90.2 | .853 | 980. |
| 95 (tip) | 1.365 | 92.4 | .777 | 943. | 1.456 | 91.1 | .826 | 963. | 1.374 | 95.9 | .774 | 919. | 1.412 | 92.2 | .815 | 945. |
| MR | 1.478 | 94.3 | .903 | 1056. | 1.647 | 89.1 | .932 | 1056. | 1.615 | 95.4 | .953 | 1093. | 1.609 | 90.3 | .936 | 1058. |
| | | | 252° | | | | 282° | | | | | 312° | | | 342° | |
| 5 (hub) | 1.808 | 90.3 | .990 | 1125. | 1.637 | 101.6 | 1.022 | 1147. | 1.761 | 88.2 | .990 | 1123. | 1.583 | 100.5 | 1.007 | 1128. |
| 10 | 1.769 | 90.0 | .990 | 1121. | 1.764 | 95.7 | 1.012 | 1134. | 1.707 | 88.6 | .984 | 1113. | 1.665 | 95.6 | .993 | 1109. |
| 15 | 1.739 | 89.7 | .983 | 1109. | 1.744 | 94.3 | .989 | 1111. | 1.682 | 89.9 | .971 | 1098. | 1.651 | 94.7 | .969 | 1084. |
| 30 | 1.667 | 83.3 | .944 | 1068. | 1.721 | 93.1 | .976 | 1100. | 1.657 | 89.7 | .953 | 1080. | 1.652 | 93.9 | .966 | 1080. |
| 50 | 1.596 | 91.9 | .946 | 1072. | 1.591 | 96.2 | .962 | 1082. | 1.538 | 92.8 | .929 | 1059. | 1.586 | 94.6 | .944 | 1059. |
| 70 | 1.475 | 93.7 | .911 | 1035. | 1.503 | 97.7 | .932 | 1052. | 1.488 | 91.7 | .905 | 1033. | 1.478 | 96.7 | .930 | 1046. |
| 85 | 1.464 | 91.5 | .888 | 1020. | 1.486 | 93.5 | .909 | 1042. | 1.465 | 89.8 | .877 | 1013. | 1.445 | 94.8 | .896 | 1020. |
| 90 | 1.447 | 90.0 | .871 | 1008. | 1.461 | 92.4 | .882 | 1018. | 1.449 | 87.4 | .861 | 1001. | 1.430 | 93.0 | .867 | 994. |
| 95 (tip) | 1.424 | 92.1 | .832 | 971. | 1.366 | 94.8 | .795 | 929. | 1.437 | 90.3 | .823 | 965. | 1.348 | 94.1 | .799 | 924. |
| MR | 1.590 | 91.1 | .934 | 1062. | 1.596 | 95.5 | .953 | 1078. | 1.567 | 90.6 | .926 | 1057. | 1.553 | 95.3 | .941 | 1059. |

Inlet plenum conditions: $P_o = 1977.0$ psia $T_o = 519.4^\circ R$
 V_m calculation is based on standard-day inlet plenum conditions
 Circumferential reference position is TDC looking forward.
 Relative position of circumferential distortion screen is $30^\circ - 150^\circ$
 $\beta_{12} = \tan^{-1} [\tan \beta_{12} / \cos \epsilon]$

STATOR DISCHARGE CIRCUMFERENTIAL DISTRIBUTIONS
DISK PROBE STATION 12, 100% OF DESIGN SPEED, $W\sqrt{\theta}/\delta = 165.68$

Inlet plenum conditions: $P_0 = 1987.0$ psfa $T_0 = 524.5^\circ\text{R}$
 V_m calculation is based on standard-day inlet plenum conditions
 Circumferential reference position is TDC looking forward
 Relative position of circumferential distortion screen is $30^\circ - 150^\circ$
 $\beta_{12} = \tan^{-1} [\tan \beta_{12} / \cos \epsilon]$

TABLE 16.5

**STATOR DISCHARGE CIRCUMFERENTIAL DISTRIBUTIONS
DISK PROBE STATION 12, 100% OF DESIGN SPEED, $W\sqrt{\theta}/\delta = 156.00$**

| Circumferential Position | 12° | | | | 42° | | | | 72° | | | | 102° | | | |
|-----------------------------|--------|--------------|----------------------|------|------|-------|--------------|----------------------|------|-------|-------|--------------|----------------------|------|-------|-------|
| | % Span | P_{12}/P_0 | $90^\circ\beta_{12}$ | M | V | V_m | P_{12}/P_0 | $90^\circ\beta_{12}$ | M | V | V_m | P_{12}/P_0 | $90^\circ\beta_{12}$ | M | V | V_m |
| 5 (hub) | | 1.742 | 89.2 | .755 | 887. | 887. | 1.548 | 89.7 | .670 | 780. | 780. | 1.275 | 95.3 | .218 | 262. | 261. |
| 10 | | 1.675 | 91.6 | .706 | 833. | 833. | 1.554 | 90.5 | .671 | 777. | 777. | 1.282 | 95.2 | .244 | 293. | 292. |
| 15 | | 1.653 | 93.2 | .686 | 810. | 809. | 1.550 | 90.6 | .664 | 768. | 768. | 1.295 | 95.5 | .275 | 330. | 328. |
| 30 | | 1.665 | 91.9 | .683 | 806. | 806. | 1.547 | 89.4 | .658 | 764. | 764. | 1.340 | 95.6 | .366 | 437. | 435. |
| 50 | | 1.631 | 92.7 | .648 | 769. | 768. | 1.534 | 89.1 | .625 | 729. | 729. | 1.444 | 94.4 | .532 | 635. | 633. |
| 70 | | 1.587 | 92.7 | .611 | 736. | 735. | 1.499 | 93.0 | .572 | 674. | 673. | 1.589 | 93.3 | .668 | 793. | 792. |
| 85 | | 1.564 | 88.7 | .589 | 720. | 719. | 1.478 | 93.3 | .526 | 630. | 629. | 1.615 | 91.8 | .653 | 785. | 785. |
| 90 | | 1.591 | 87.9 | .601 | 735. | 735. | 1.470 | 92.5 | .510 | 614. | 614. | 1.610 | 91.2 | .640 | 774. | 774. |
| 95 (tip) | | 1.577 | 89.0 | .580 | 714. | 713. | 1.428 | 94.4 | .456 | 551. | 549. | 1.577 | 91.2 | .599 | 727. | 727. |
| MR | | 1.627 | 91.5 | .649 | 776. | 775. | 1.520 | 91.0 | .610 | 715. | 715. | 1.500 | 93.6 | .569 | 681. | 679. |
| | | | | | | | | | | | | | | | | |
| 5 (hub) | | 1.477 | 90.7 | .636 | 764. | 764. | 1.680 | 86.6 | .716 | 847. | 846. | 1.822 | 91.4 | .941 | 1084. | 1084. |
| 10 | | 1.502 | 93.6 | .658 | 791. | 789. | 1.694 | 87.6 | .730 | 860. | 859. | 1.841 | 90.9 | .935 | 1077. | 1077. |
| 15 | | 1.544 | 94.8 | .696 | 835. | 832. | 1.700 | 89.7 | .743 | 854. | 854. | 1.825 | 90.4 | .922 | 1064. | 1064. |
| 30 | | 1.663 | 89.5 | .778 | 933. | 933. | 1.752 | 87.9 | .743 | 870. | 869. | 1.790 | 89.0 | .871 | 1015. | 1015. |
| 50 | | 1.658 | 89.8 | .744 | 911. | 911. | 1.652 | 87.3 | .647 | 769. | 768. | 1.558 | 90.3 | .645 | 775. | 775. |
| 70 | | 1.634 | 92.4 | .704 | 876. | 875. | 1.481 | 90.7 | .517 | 630. | 630. | 1.438 | 95.3 | .529 | 650. | 647. |
| 85 | | 1.610 | 93.9 | .655 | 826. | 824. | 1.424 | 96.2 | .444 | 550. | 547. | 1.450 | 99.3 | .516 | 646. | 637. |
| 90 | | 1.598 | 93.2 | .638 | 808. | 807. | 1.411 | 96.2 | .423 | 528. | 525. | 1.447 | 99.4 | .499 | 629. | 620. |
| 95 (tip) | | 1.573 | 93.2 | .603 | 766. | 765. | 1.403 | 96.2 | .406 | 509. | 506. | 1.439 | 100.3 | .465 | 587. | 578. |
| MR | | 1.617 | 91.7 | .710 | 871. | 870. | 1.608 | 89.7 | .639 | 765. | 765. | 1.637 | 92.5 | .743 | 887. | 886. |
| | | | | | | | | | | | | | | | | |
| 5 (hub) | | 1.823 | 86.3 | .837 | 975. | 973. | 1.716 | 92.9 | .907 | 1038. | 1036. | 1.819 | 86.7 | .857 | 995. | 993. |
| 10 | | 1.787 | 87.9 | .817 | 951. | 951. | 1.749 | 92.4 | .910 | 1037. | 1036. | 1.750 | 87.9 | .819 | 953. | 952. |
| 15 | | 1.783 | 88.5 | .811 | 944. | 943. | 1.760 | 91.7 | .911 | 1037. | 1037. | 1.739 | 88.7 | .804 | 935. | 935. |
| 30 | | 1.756 | 87.8 | .779 | 908. | 907. | 1.737 | 89.7 | .866 | 998. | 998. | 1.734 | 88.7 | .785 | 916. | 916. |
| 50 | | 1.611 | 90.2 | .665 | 789. | 789. | 1.598 | 90.3 | .718 | 843. | 843. | 1.660 | 91.9 | .714 | 844. | 843. |
| 70 | | 1.507 | 92.2 | .571 | 691. | 691. | 1.506 | 93.7 | .632 | 754. | 753. | 1.609 | 92.1 | .671 | 805. | 804. |
| 85 | | 1.467 | 94.7 | .528 | 651. | 649. | 1.483 | 93.9 | .592 | 718. | 716. | 1.568 | 88.6 | .640 | 780. | 780. |
| 90 | | 1.456 | 94.5 | .509 | 631. | 629. | 1.478 | 93.6 | .570 | 697. | 696. | 1.572 | 87.4 | .635 | 777. | 776. |
| 95 (tip) | | 1.449 | 94.3 | .497 | 619. | 617. | 1.444 | 93.7 | .522 | 641. | 639. | 1.564 | 87.4 | .617 | 759. | 758. |
| MR | | 1.637 | 90.3 | .692 | 823. | 823. | 1.619 | 91.8 | .759 | 890. | 890. | 1.667 | 89.7 | .728 | 864. | 864. |

Inlet Plenum Conditions: $P_0 = 2001.0$ psfa $T_0 = 522.8^\circ\text{R}$
 V_m calculation is based on standard-day inlet plenum conditions
 Circumferential reference position is TDC looking forward
 Relative position of circumferential distortion screen is $30^\circ - 150^\circ$
 $\beta_{12} = \tan^{-1} [\tan \beta_{12} / \cos \epsilon]$

TABLE 17.1

STATOR DISCHARGE CIRCUMFERENTIAL DISTRIBUTIONS
TEMPERATURE RAKES 88% SPEED

| Circumferential Position, T_{12}/T_0 | | 26° | 56° | 86° | 116° | 146° | 176° | 206° | 236° | 266° | 296° | 326° | 356° |
|--|----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| % Span | | | | | | | | | | | | | |
| Hub | 5 | 1.149 | 1.135 | 1.144 | 1.163 | 1.206 | 1.231 | 1.202 | 1.186 | 1.182 | 1.179 | 1.167 | 1.171 |
| | 10 | 1.133 | 1.111 | 1.139 | 1.157 | 1.200 | 1.212 | 1.189 | 1.177 | 1.172 | 1.167 | 1.155 | 1.156 |
| | 15 | 1.123 | 1.098 | 1.139 | 1.153 | 1.198 | 1.197 | 1.178 | 1.172 | 1.169 | 1.161 | 1.150 | 1.174 |
| | 30 | 1.117 | 1.091 | 1.139 | 1.158 | 1.198 | 1.191 | 1.172 | 1.167 | 1.163 | 1.157 | 1.147 | 1.139 |
| | 50 | 1.111 | 1.101 | 1.154 | 1.159 | 1.211 | 1.179 | 1.164 | 1.161 | 1.158 | 1.153 | 1.142 | 1.174 |
| | 70 | 1.105 | 1.107 | 1.152 | 1.171 | 1.228 | 1.169 | 1.166 | 1.151 | 1.150 | 1.146 | 1.136 | 1.130 |
| | 85 | 1.107 | 1.115 | 1.169 | 1.188 | 1.246 | 1.169 | 1.166 | 1.156 | 1.151 | 1.154 | 1.138 | 1.126 |
| | 90 | 1.121 | 1.120 | 1.176 | 1.200 | 1.253 | 1.187 | 1.181 | 1.175 | 1.168 | 1.170 | 1.148 | 1.138 |
| | 95 | 1.137 | 1.127 | 1.182 | 1.214 | 1.264 | 1.200 | 1.195 | 1.189 | 1.182 | 1.185 | 1.166 | 1.157 |
| Tip | | | | | | | | | | | | | |
| Inlet plenum conditions: $P_0 = 1994.0$ psfa $T_0 = 519.6^\circ\text{R}$ | | | | | | | | | | | | | |
| Hub | 5 | 1.159 | 1.148 | 1.154 | 1.177 | 1.206 | 1.218 | 1.197 | 1.187 | 1.185 | 1.178 | 1.173 | 1.168 |
| | 10 | 1.148 | 1.134 | 1.154 | 1.172 | 1.204 | 1.208 | 1.185 | 1.176 | 1.174 | 1.169 | 1.165 | 1.159 |
| | 15 | 1.140 | 1.131 | 1.156 | 1.170 | 1.201 | 1.196 | 1.181 | 1.170 | 1.167 | 1.160 | 1.155 | 1.149 |
| | 30 | 1.139 | 1.135 | 1.170 | 1.177 | 1.196 | 1.195 | 1.184 | 1.168 | 1.165 | 1.155 | 1.151 | 1.148 |
| | 50 | 1.141 | 1.148 | 1.190 | 1.186 | 1.205 | 1.200 | 1.183 | 1.172 | 1.165 | 1.155 | 1.149 | 1.147 |
| | 70 | 1.145 | 1.159 | 1.202 | 1.219 | 1.227 | 1.209 | 1.190 | 1.180 | 1.171 | 1.164 | 1.159 | 1.152 |
| | 85 | 1.162 | 1.174 | 1.221 | 1.245 | 1.243 | 1.230 | 1.207 | 1.198 | 1.188 | 1.183 | 1.177 | 1.167 |
| | 90 | 1.175 | 1.180 | 1.226 | 1.250 | 1.252 | 1.238 | 1.218 | 1.206 | 1.196 | 1.193 | 1.188 | 1.179 |
| | 95 | 1.186 | 1.187 | 1.232 | 1.253 | 1.262 | 1.250 | 1.230 | 1.217 | 1.208 | 1.204 | 1.201 | 1.189 |
| Tip | | | | | | | | | | | | | |
| Inlet plenum conditions: $P_0 = 2022$ psfa $T_0 = 512.0^\circ\text{R}$ | | | | | | | | | | | | | |

$$\frac{W\sqrt{\theta}}{\delta} = 161.5$$

$$\frac{W\sqrt{\theta}}{\delta} = 140.5$$

TABLE 17.2

STATOR DISCHARGE CIRCUMFERENTIAL DISTRIBUTIONS TEMPERATURE RAKES 100% SPEED

| Circumferential Position, T_{12}/T_0 | | 26° | 56° | 86° | 116° | 146° | 176° | 206° | 236° | 266° | 296° | 326° | 356° |
|--|----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| % Span | | | | | | | | | | | | | |
| $\frac{W\sqrt{\theta}}{\delta} = 177.2$ | | | | | | | | | | | | | |
| Hub | 5 | 1.197 | 1.172 | 1.178 | 1.213 | 1.265 | 1.289 | 1.258 | 1.244 | 1.241 | 1.235 | 1.212 | 1.209 |
| | 10 | 1.178 | 1.142 | 1.165 | 1.206 | 1.258 | 1.272 | 1.248 | 1.235 | 1.230 | 1.223 | 1.199 | 1.192 |
| | 15 | 1.168 | 1.125 | 1.162 | 1.201 | 1.257 | 1.258 | 1.243 | 1.228 | 1.225 | 1.217 | 1.196 | 1.184 |
| | 30 | 1.158 | 1.109 | 1.164 | 1.204 | 1.257 | 1.244 | 1.232 | 1.225 | 1.218 | 1.209 | 1.194 | 1.184 |
| | 50 | 1.155 | 1.115 | 1.178 | 1.210 | 1.265 | 1.240 | 1.239 | 1.227 | 1.218 | 1.210 | 1.196 | 1.185 |
| | 70 | 1.154 | 1.121 | 1.183 | 1.234 | 1.277 | 1.213 | 1.214 | 1.196 | 1.193 | 1.195 | 1.187 | 1.176 |
| Tip | 85 | 1.164 | 1.134 | 1.221 | 1.250 | 1.312 | 1.221 | 1.217 | 1.214 | 1.203 | 1.210 | 1.185 | 1.180 |
| | 90 | 1.183 | 1.143 | 1.226 | 1.269 | 1.324 | 1.229 | 1.229 | 1.227 | 1.219 | 1.223 | 1.201 | 1.198 |
| | 95 | 1.201 | 1.154 | 1.232 | 1.291 | 1.334 | 1.235 | 1.244 | 1.242 | 1.232 | 1.236 | 1.218 | 1.215 |
| Inlet plenum conditions: $P_0 = 1977.0$ psfa $T_0 = 519.4^\circ\text{R}$ | | | | | | | | | | | | | |
| $\frac{W\sqrt{\theta}}{\delta} = 165.7$ | | | | | | | | | | | | | |
| Hub | 5 | 1.201 | 1.174 | 1.185 | 1.239 | 1.267 | 1.281 | 1.250 | 1.187 | 1.232 | 1.222 | 1.216 | 1.213 |
| | 10 | 1.189 | 1.165 | 1.186 | 1.227 | 1.267 | 1.275 | 1.246 | 1.226 | 1.224 | 1.212 | 1.207 | 1.202 |
| | 15 | 1.182 | 1.163 | 1.188 | 1.221 | 1.268 | 1.266 | 1.242 | 1.219 | 1.216 | 1.205 | 1.199 | 1.194 |
| | 30 | 1.178 | 1.171 | 1.217 | 1.225 | 1.269 | 1.249 | 1.239 | 1.218 | 1.215 | 1.206 | 1.199 | 1.194 |
| | 50 | 1.185 | 1.189 | 1.256 | 1.242 | 1.285 | 1.249 | 1.230 | 1.213 | 1.210 | 1.205 | 1.200 | 1.230 |
| | 70 | 1.189 | 1.209 | 1.271 | 1.292 | 1.322 | 1.266 | 1.239 | 1.222 | 1.214 | 1.206 | 1.201 | 1.196 |
| Tip | 85 | 1.201 | 1.227 | 1.293 | 1.322 | 1.347 | 1.296 | 1.267 | 1.251 | 1.245 | 1.215 | 1.202 | 1.197 |
| | 90 | 1.217 | 1.235 | 1.303 | 1.334 | 1.356 | 1.309 | 1.279 | 1.266 | 1.259 | 1.229 | 1.216 | 1.213 |
| | 95 | 1.233 | 1.245 | 1.315 | 1.332 | 1.368 | 1.324 | 1.296 | 1.282 | 1.275 | 1.244 | 1.232 | 1.229 |
| Inlet plenum conditions: $P_0 = 1987.0$ psfa $T_0 = 524.5^\circ\text{R}$ | | | | | | | | | | | | | |
| $\frac{W\sqrt{\theta}}{\delta} = 156.0$ | | | | | | | | | | | | | |
| Hub | 5 | 1.200 | 1.179 | 1.190 | 1.245 | 1.265 | 1.282 | 1.255 | 1.237 | 1.234 | 1.225 | 1.218 | 1.209 |
| | 10 | 1.188 | 1.169 | 1.190 | 1.233 | 1.263 | 1.274 | 1.249 | 1.227 | 1.226 | 1.216 | 1.208 | 1.199 |
| | 15 | 1.181 | 1.166 | 1.192 | 1.225 | 1.263 | 1.264 | 1.246 | 1.222 | 1.222 | 1.210 | 1.201 | 1.191 |
| | 30 | 1.179 | 1.171 | 1.209 | 1.227 | 1.263 | 1.255 | 1.245 | 1.226 | 1.224 | 1.209 | 1.202 | 1.193 |
| | 50 | 1.185 | 1.185 | 1.234 | 1.245 | 1.275 | 1.256 | 1.241 | 1.222 | 1.221 | 1.207 | 1.204 | 1.196 |
| | 70 | 1.193 | 1.207 | 1.264 | 1.295 | 1.304 | 1.267 | 1.253 | 1.233 | 1.228 | 1.216 | 1.213 | 1.199 |
| Tip | 85 | 1.213 | 1.227 | 1.288 | 1.326 | 1.334 | 1.301 | 1.283 | 1.260 | 1.254 | 1.240 | 1.231 | 1.215 |
| | 90 | 1.225 | 1.237 | 1.296 | 1.329 | 1.342 | 1.314 | 1.294 | 1.274 | 1.269 | 1.253 | 1.248 | 1.232 |
| | 95 | 1.243 | 1.247 | 1.305 | 1.334 | 1.353 | 1.324 | 1.309 | 1.287 | 1.284 | 1.269 | 1.266 | 1.248 |
| Inlet plenum conditions: $P_0 = 2001.0$ psfa $T_0 = 522.8^\circ\text{R}$ | | | | | | | | | | | | | |

TABLE 18

STAGE OVERALL PERFORMANCE FOR INLET CIRCUMFERENTIAL DISTORTION

| <u>% of Design Speed</u> | <u>$W\sqrt{\theta}/\delta$</u> | <u>P_{12}/P_8</u> | <u>η</u> | <u>T_{12}/T_0</u> |
|------------------------------|---|--------------------------------|--------------------------|--------------------------------|
| 88 | 161.5 | 1.502 | 75.6 | 1.163 |
| | 140.5 | 1.572 | 75.1 | 1.184 |
| 100 | 177.2 | 1.655 | 73.3 | 1.212 |
| | 165.7 | 1.766 | 74.4 | 1.238 |
| | 156.0 | 1.745 | 71.1 | 1.243 |

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